AVIATION

The Oldest American Aeronautical Magazine

MARCH 23, 1929 Issued Weekly PRICE 20 CENTS

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A Western Air Express tri-engined Fokker transport monoplane in flight.

VOLUME XXVI

NUMBER 12

Special Features

Aviation in Siam

Location and Ownership of Airports

Ignition Shielding for Radio Operation

McGRAW-HILL PUBLISHING COMPANY, INC.
TENTH AVENUE AT 36TH STREET
NEW YORK, N. Y.

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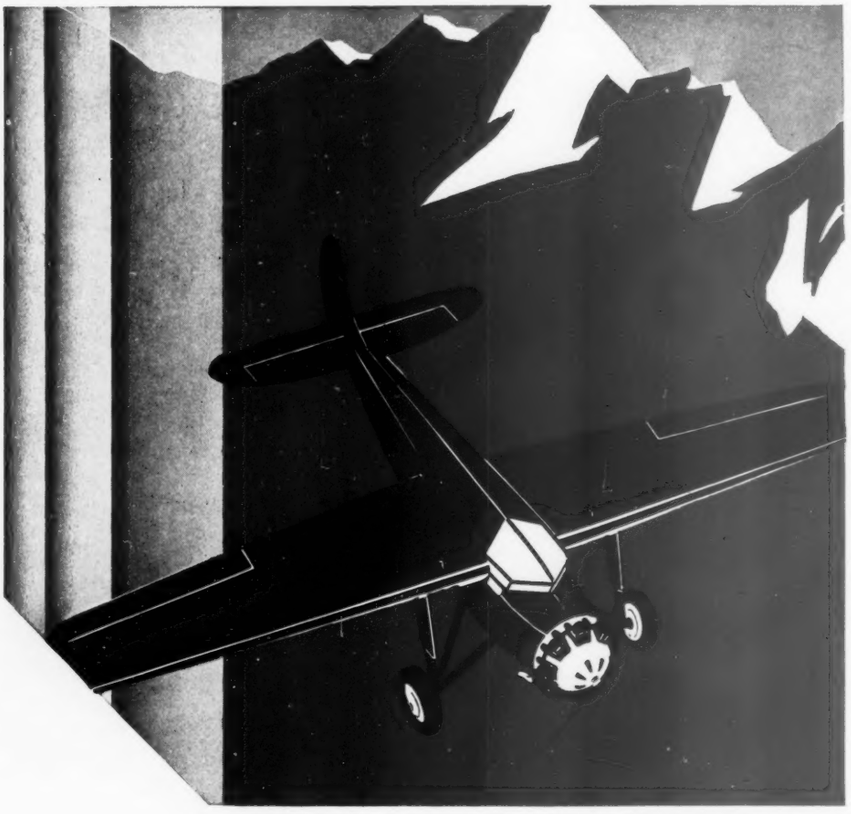

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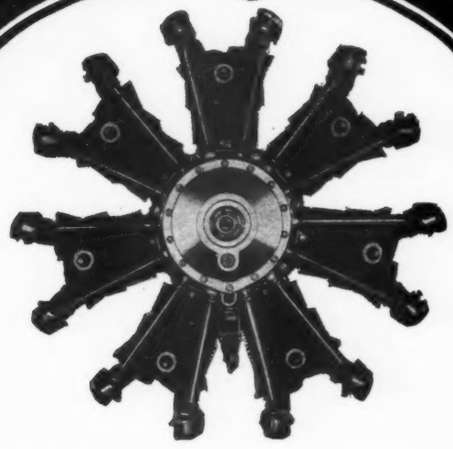

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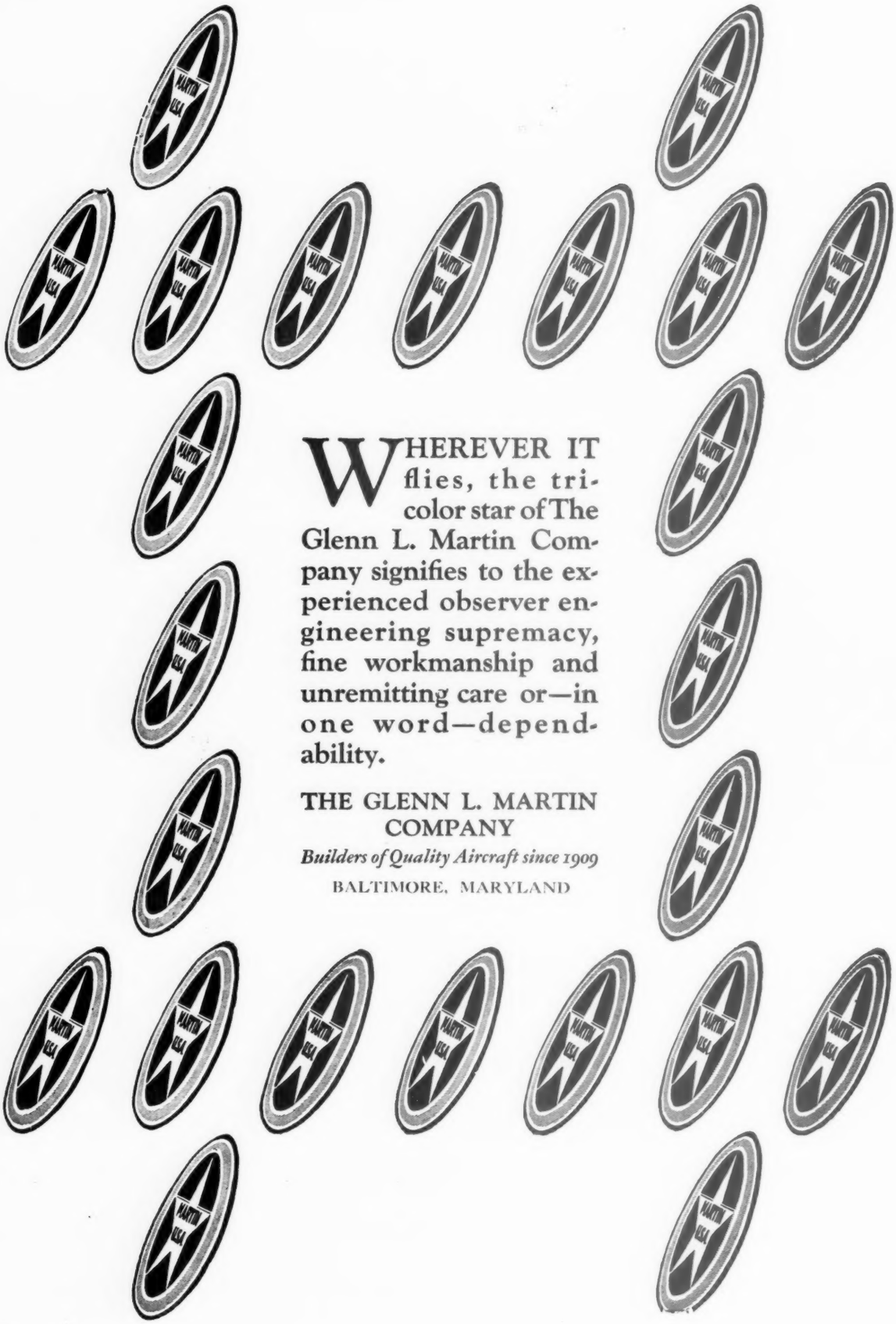

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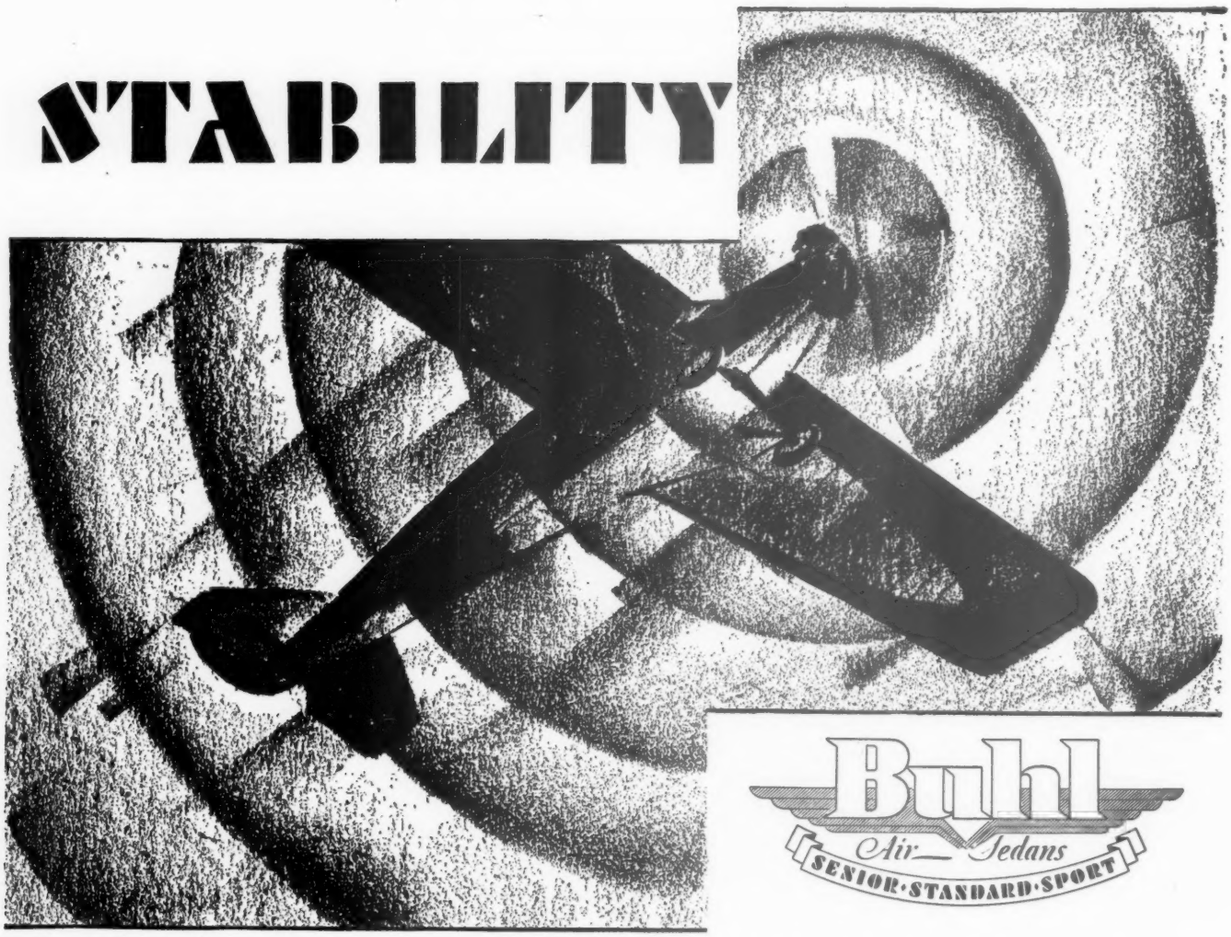

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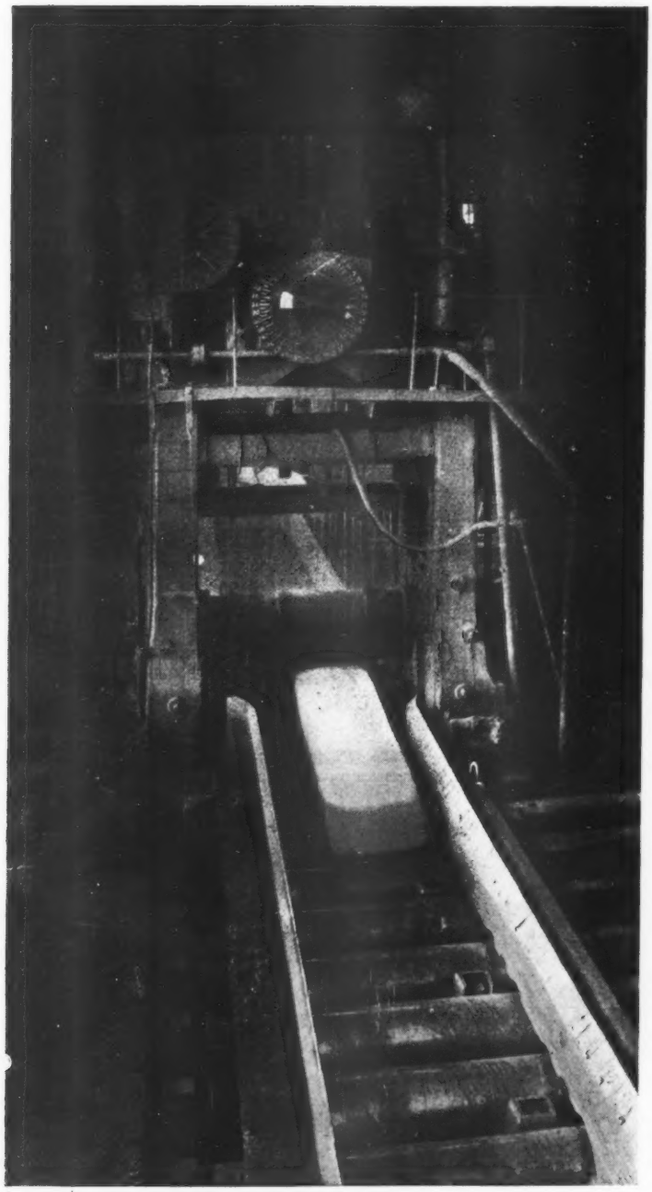

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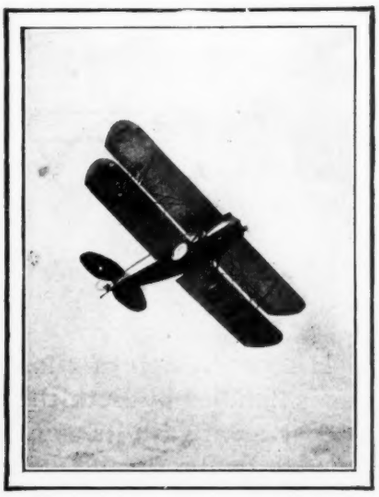

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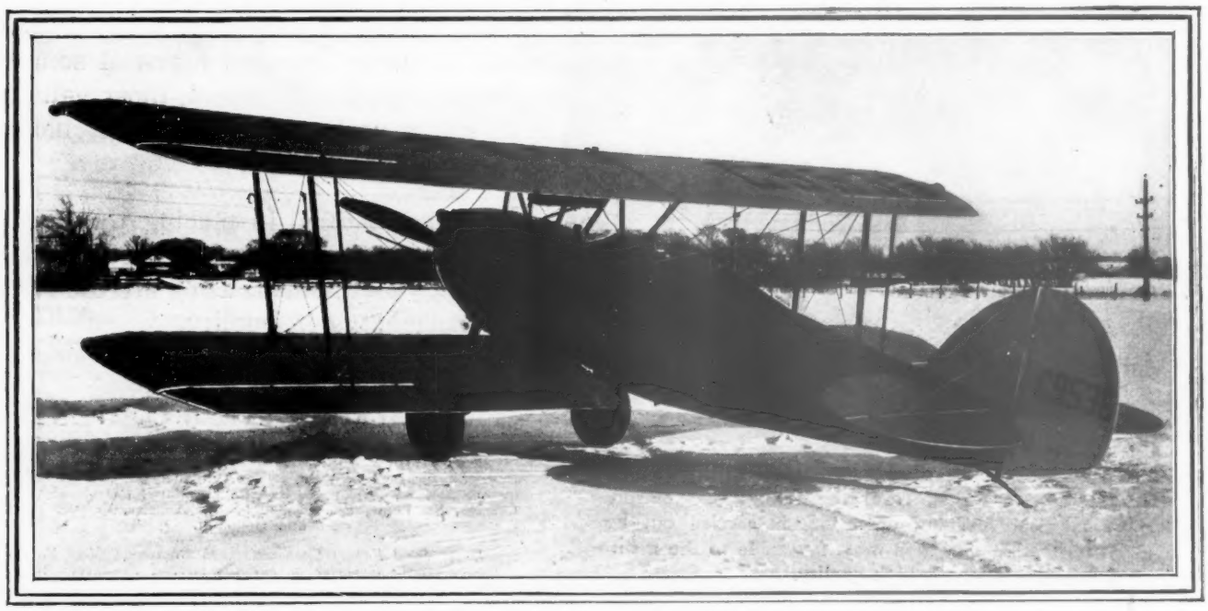

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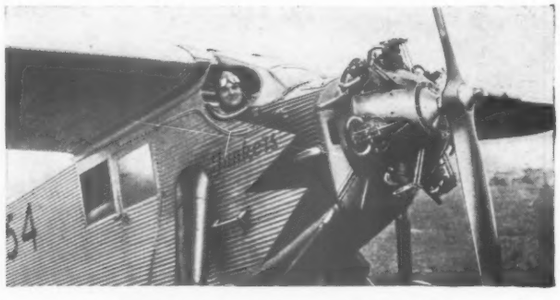

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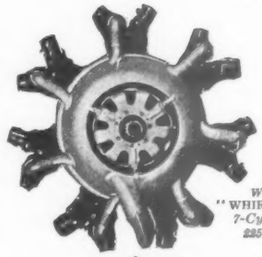

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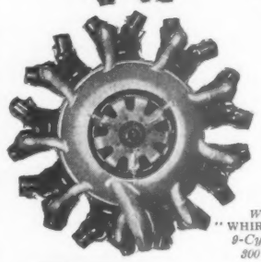

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AVIATION

The Oldest American Aeronautical Magazine

Vol. XXVI MARCH 23, 1929 No. 12

Fraudulent Advertising

EVERY publisher of repute scrutinizes his advertising pages to make sure that there is no wording therein which is obviously false, and no statements which are deliberately intended to defraud. On the whole, papers devoted to aeronautics have been very free from fraudulent advertising, and where such advertising has appeared it has usually been because the true facts had not been called to the attention of the publishers. The obtaining of the true facts is, however, often a very difficult matter, and even when the facts are obtained, there are times when it is a matter of opinion as to whether the advertising is really fraudulent and likely to deceive the reader.

For this reason the Publishers' Section of the Aeronautical Chamber of Commerce has formed a committee which will gather information and establish policies with regard to advertising which appears to be doubtful in its nature. Meetings will be held periodically for the exchange of information and ideas, and it is to be hoped that the combined efforts of the publishers and the Chamber will maintain aeronautical advertising at a very high standard. Those who have reason to believe that any advertising is fraudulent, or written with an intent to deceive, will help greatly if they forward their information to the Aeronautical Chamber of Commerce in New York.

Detroit Show Value

ACCORDING to present reports, the second annual All-American Aircraft Show, to be held in Convention Hall, Detroit, Mich., April 6 to 14, will be the largest and most elaborately staged aeronautical exhibit ever held in the history of the industry. Thus far, 69 aircraft manufacturers have contracted to show a total of 107 planes, and 121 engine, accessory and equipment manufacturers have agreed to take space, and still more are expected to be lined up before the doors are thrown open.

Such record breaking representation of American aeronautical activity might be regarded as the result of complying with four important factors in the holding of a successful national show. First: sanction and recognition were obtained. Second: financial success was attained in a previous attempt. Third: the sponsors, show committee and other cooperating individuals and organizations executed their various tasks in a thorough and business-like way. And fourth: a date was selected when good flying weather the country over would be just starting, and, incidentally, permit actual flight demonstations at the nearest airport.

What will be the limit in the size and splendor of national aircraft shows is something which only the future will bring to light. Thus far, each national show has succeeded in surpassing its predecessor, not only from the standpoint of quality and quantity, but also from the standpoint of actual dollars and cents value to the exhibitors and the aeronautic industry as a whole. In the early days aircraft shows were composed mostly of military products. Then little by little the commercial manufacturer began to make his appearance at aircraft displays, not so much with the idea of making individual plane sales, as with the idea of cashing in on the advertising value of such affairs. From that stage the national air shows passed into an era of retail sales and distributor and dealer contacts.

That era is on the rise at present, particularly regarding the contacting and signing up of distributors and dealers. As has been mentioned before, the item of production has held the center of the stage since Lindbergh's flight, but now the time has arrived when the items of a national sales organization and a national servicing organization demand concentrated attention by all progressive manufacturers, Therefore, the coming Detroit Show offers a splendid opportunity for the manufacturer to strengthen the sales and distribution phase of his business. It is a foregone conclusion that the Detroit affair will be a financial success for its sponsor, but whether or not it will be a real financial success for the individual exhibitor depends entirely upon the effort exerted by the individual hibitor.

Edward P. Warner

AMERICAN aviation has been singularly fortunate in the quality of the men who have been at the head of the government departments during the past few years. These years have been years of extraordinary growth and during them the Government has laid down policies and established precedents which will greatly influence the course of aviation. Those in the industry will regret that these same men can not all continue during the next four years. We have become acquainted with them and they have become acquainted with us, and even though their successors be excellent men it will take some time before a new relationship is established.

Edward P. Warner, who has resigned from his post as Assistant Secretary of the Navy for Aeronautics, leaves his term of public office with his reputation much more firmly and widely established than when he left the professorship at the Massachusetts Institute of Technology. He has met many men throughout the nation and has impressed them with the sincerity of his interest in aeronautical development and with the depth of his knowledge of the subject. He has done more than his share in spreading the gospel of aviation to the serious-minded and intelligent citizens of this country. He has willingly and effectively cooperated in many movements for the fostering of aviation and the breadth of his views has helped guide them along sound lines. We wish him the success that he deserves in his private life, and are sincerely sorry to see him leave his post with the Navy.

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Location *and* Ownership *of* Airports

By ANDREW R. BOONE

CONSIDERABLE has been written during recent months concerning the necessity of communities establishing adequate airports in order to be represented properly on the growing map of air networks. Possibly less thought has been accorded to the matter of airport location and ownership. Pilots who have had occasion to travel over the country will tell you that too many airports are crowded against hills, about tall trees or poles bearing high tension lines, or generally are undesirable physically and geographically.

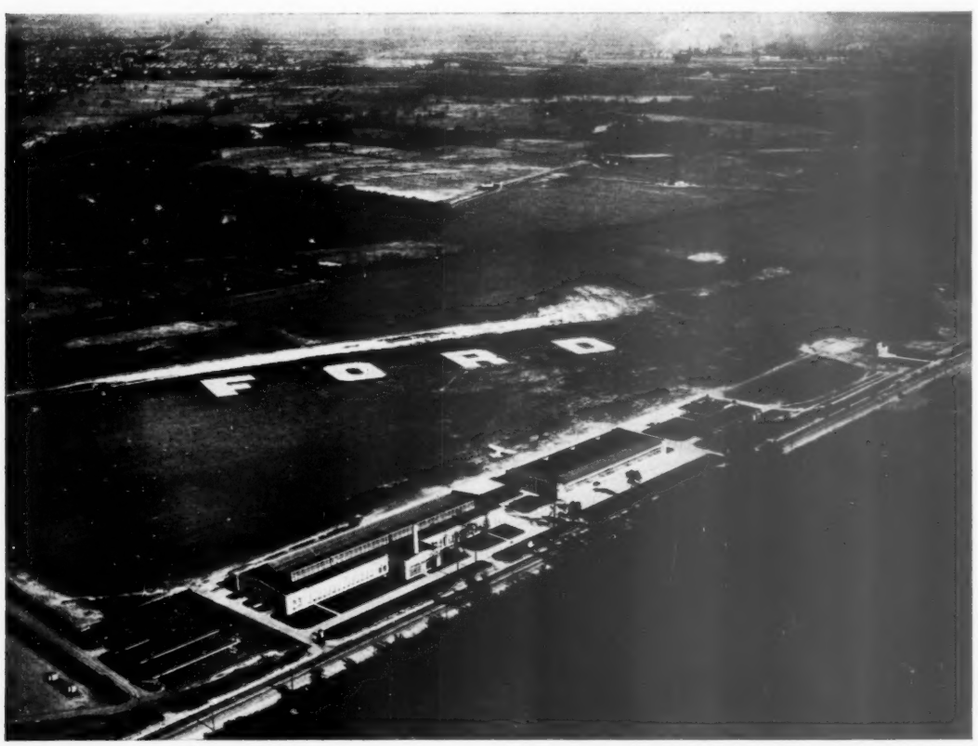
There is general agreement, I believe, that rather than sacrifice adequate space for "close in" land of too little area, the port should be located at the farther point. The "close in" port manifestly is desirable, but so is a large tract free from obstructions. Then there is the matter of future traffic to consider. Today's airline and other aerial business cannot approximate that of five or ten years hence.

There is no disagreement with the department of commerce recommendations for airport constructions. These should be amplified and made more comprehensive, however. An airport should be not only constructed but also located and owned. These are the phases of the problem with which this article is concerned.

Department of Commerce representatives have preached through the breadth of the land their sermons on airport regulations. They continually carry to ambitious communities sermons of "adequate terminal facilities." As William P. McCracken, Jr., has pointed out, "there is no method of transportation more dependent on its terminal facilities for successful operation than is air transport.

"We ordinarily think of the ownership of terminals as being vested in one or more of the transportation companies," he has commented. "This is true, generally speaking, of railroads, interurban and bus lines. When it comes to water-borne traffic, however, many municipalities have provided piers and docks and the harbor and anchorage facilities are practically always owned by the public and available for general use.

"When air transportation first made its appearance in this country the capital of the operators was limited. They were therefore dependent, in a large measure, upon publicly-owned airports for their terminals, or also upon tracts of land on the outskirts of the community which they leased at comparatively nominal rentals. The result was that from the beginning there was a very strong sentiment in favor of public ownership of air terminal facilities. This idea undoubtedly was born of necessity, but it can be supported by much sounder arguments, although, of course, there is nothing more impelling than dire necessity."



The Ford Airport at Dearborn, Mich., headquarters of Stout Air Services, Inc.

Fortunately for air transportation, the air is free to all who will use it. While for purposes of communication and general public safety some cost will attach to maintaining rights of way, the large cost will center around the terminals. To date it has not been customary to grant certificates of con-

venience and necessity. Since franchises for operation in certain air lanes are not granted, the terminals, being public have been made available to the public.

Manifestly those communities will profit best, in an air way, which give all air operators equal opportunities and award no monopolies at their airports. No community situated on a bay or river would turn over its water facilities to a single carrier. The same logic applies to air transportation. Thus again public ownership or at least public control of airports scores an important point.

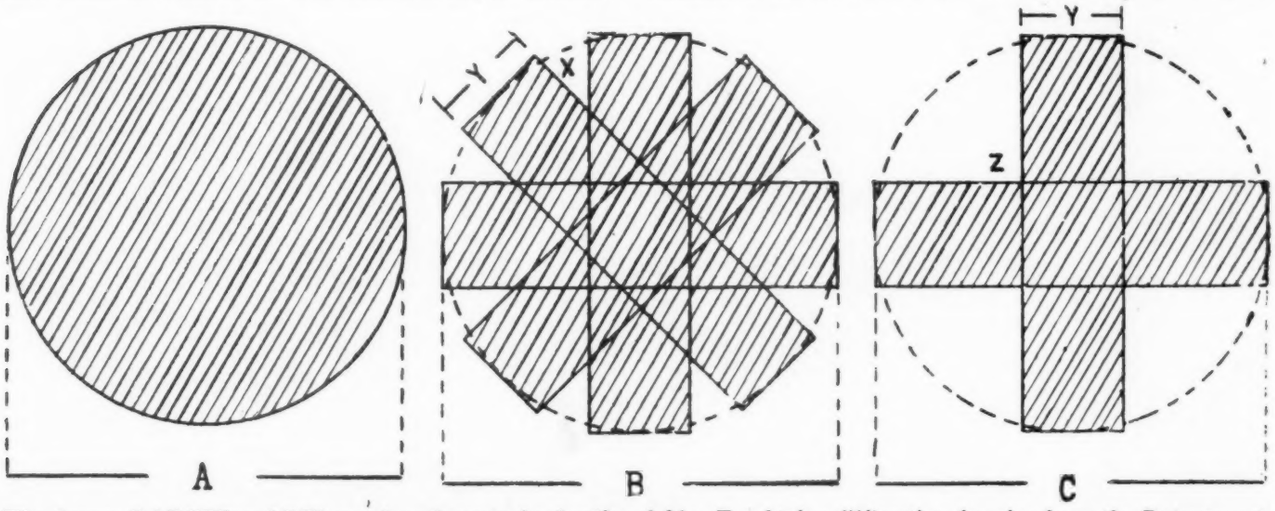
North Island, San Diego, Calif., which is both an Army and a Navy aviation base.

In many towns through the country, especially in those regions not reasonably closely adjacent to such air centers as Los Angeles and New York, it is doubtful whether the public is fully aware that air transport is firmly established as an integral part of the nation's transportation system. If the case for public control of airports need be strengthened, these facts may help. There are now approximately 4,000 aircraft owned by civilians in the United States. Less than one-tenth of these are owned by the air mail contractors and corporations operating on regular schedule. Approximately 2,000 airplanes are owned by individuals ready to furnish them for general use by the public. This includes such tasks as crop dusting, taxi service, private air yacht, regular transport, etc. Others are used for private purposes and recreation.

Because of the public nature of air transport and its growing public importance the government through its commerce department officials supports the statement that each community should have at least one airport centrally located (if possible) and publicly controlled. The Department of Commerce goes further than recommending public control and advocates municipal ownership. Manifestly, where possible, such an arrangement will serve the public good best.

The reasons for public ownership are obvious. While private owners may guarantee equal treatment to all lessees and users, there remains the possibility of such arrangements not being carried out. Failure of a private owner to keep such an agreement might bring real disaster to a community. This is not to be taken as an implied criticism of privately owned airports as presently conducted; it refers only to the matter of public policy.

Also, as Mr. MacCracken has pointed out, "another objection to private ownership of airports is that there is always the possibility that the land will become more valuable to the owners for some other purposes and that



The figures "A," "B" and "C" are three layouts for landing fields. To obtain a "1" rating for size from the Department of Commerce, the types A and B must measure 2,500 ft. For a "2" rating, layouts A and B must measure 2,000 ft. and layout C must measure 2,500 ft.; for a "3" rating, A and B must be 1,600 ft. and C, 2,000 ft., and for a "4" rating, A and B should be 1,320 ft. and C, 1,600 ft. In both B and C, the landing strips, "Y," must be 500 ft. in width. The angle, "X," in B must not be less than 40 deg., and the angle, "Z," in C must not be less than 50 deg.

they might be persuaded to abandon it as an airport and turn it over to subdividers to sell. This has frequently been the case in the past, with the result that it immediately becomes more difficult to find a suitable location close to the business district.

"The development of large open tracts of land into airports, later to be subdivided and sold off when the city's growth has made this profitable, offers many attractive features to the real estate operator. He may perform a valuable service to aviation in making this land available for airport purposes, but the community should assure itself that, what will become an increasingly important facility, will not be withdrawn when the land increases in value."

What communities of any size will come to, no doubt, will be systems of airports. They will carry on at subsidiary airports school and other operations not identified with interurban and inter-state transport, while at the central airport passengers and cargo will be taken aboard and discharged. Here again the situation resembles that of a busy railroad terminal and its freight yards. On the other hand, if a community has a single airport available it must make the best of the situation.

As far as actual management is concerned, each municipality or other community must decide upon its own course. There can be little doubt that each should own its own port, but the question of management is relatively unimportant as long as fair treatment is accorded all.

Management of an airport presupposes the existence of an airport. A port cannot be made wholly effective unless it be located at the proper place with area sufficient to permit operation of those classes of heavier-than-aircraft who will have business at that point. The larger planes require larger fields for safe operation than do small planes with lower landing speeds. Again the size and location of the field depend in a measure on the "load" it must carry.

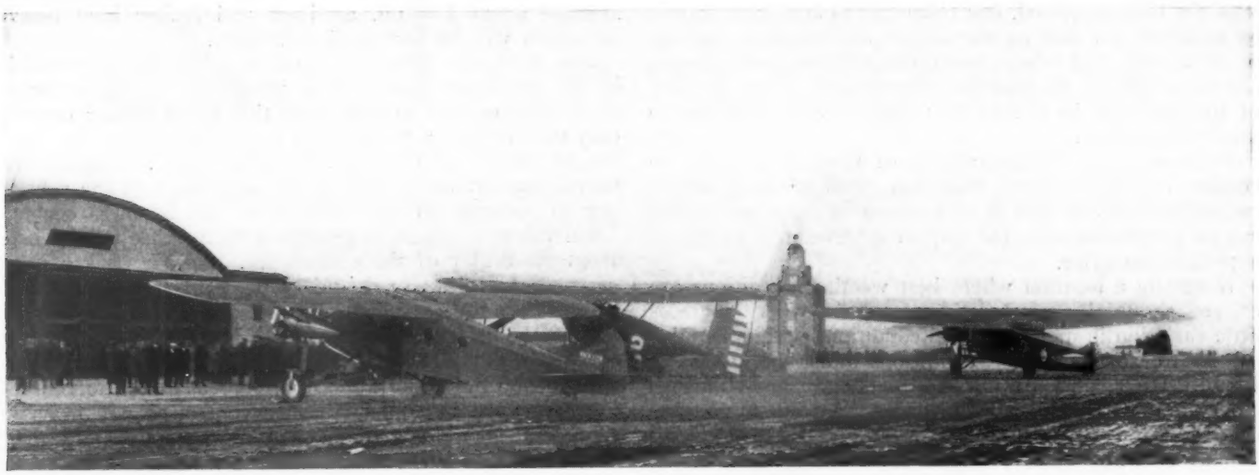
A few years ago places on which planes landed were known as fields. The term "port" supplants "field" in all its applications. The city of the future will find its airports of as vital importance as its rail and water terminals. Their locations there, therefore, are of exceeding importance. Lighter-than-aircraft require different fields and conditions than airplanes and, since for the moment we are concerned with the latter, thoughts expressed herein will be confined to ports for airplanes.

The rapid growth of aerial transportation during the past four years has developed the need of landing fields and airports in every community. All these companies want ports which are accessible to the cities they serve and since each town or city on a possible airline will want to be included as a stopping point, its citizens will be interested in a method of airport rating by which various sites under consideration may be compared.

Donald M. Baker, member of the Los Angeles Board City Planning Commissioners and a civil engineer of distinction, has studied the problem of locating municipal airports in great detail. An airport, he points out, must be considered as more than a landing field for aircraft. It is a real terminal or port, equipped with all necessary facilities and utilities for handling the arrival and departure of aircraft, their passengers and cargo, storage and repair of planes and engines, testing, etc., and must have all of the characteristics and accessories of any terminal as well as other features peculiarly incident to air traffic.

Before proceeding with methods of classifying airports, it should be recalled that the users of an airport may be classified as follows: 1. The Federal government for mili-

Chicago Municipal Airport, the junction of a number of major air transport lines.



The Los Angeles Metropolitan Airport when the "Question Mark" and other Army planes were at the field.

tary and naval planes, etc.; 2. Commercial transport organizations; 3. Owners of private pleasure and business planes; 4. Flying schools; 5. Owners of commercial and sight seeing planes; 6. Aircraft manufacturers and allied industries.

In Mr. Baker's opinion, since aviation at present occupies the status of an "infant industry" operated in relatively small units, it merits public subsidy. "The acquisition, operating and financing of municipal airports," he says, "particularly when nominal fees are charged for their use, is a most reasonable and logical form of local subsidy, and as air traffic increases in volume there is little question but that the municipal airport will become self-sustaining.

"The primary excuse for the acquisition of an airport by a municipality is the need for a major traffic terminal. In the smaller communities all types of aeronautical activities may be concentrated upon one airport, in larger centers, if not now at least in the near future when the use of the air increases, it undoubtedly will be necessary to segregate different types of use, selecting one large site for a major traffic terminal, passenger and cargo depot, testing and industrial field, etc., and one or more additional sites for the use of private commercial and sightseeing planes, flying schools and similar uses. The matter is one which must be left to the local authorities."

To the average layman or amateur, a suitable site for an airport no doubt consists of any large open area fairly level, ranging in size from 100 to 1,000 acres, located somewhere near the city and available at a price. On the contrary the selection of a site for an airport is a highly technical problem, involving the fields of aviation, city planning, transportation, meteorology, finance and law, and should be attempted only after adequate investigation and study.

Inasmuch as the capital outlay for land to be used for an airport site is considerable, and a proper location for the same will have much to do with the successful development of aeronautics generally, as Mr. Baker has pointed out, the small cost and even short delay incident to technical study and investigation prior to purchase, will usually be warranted.

Where meterological conditions vary greatly within a radius of 10 to 20 mi. from the center of the community, it is desirable that a study of such conditions be carried on at all sites under investigation for at least a year, securing data upon wind direction and velocity, visibility, occurrence of fog, rainfall, air turbulence and related matters. If time is short a study of these elements for a period extending over a few months can be made and the results correlated with the data from U. S. Weather Bureau stations in the vicinity. Other factors such as present and future accessibility, transportation, surrounding development, etc., may be investigated in a relatively short time.

As far as topography is concerned, the surface of the landing field should be flat or easily made so. Rolling or broken country is generally undesirable on account of grading costs. Experts agree that the surface should have a gentle slope to facilitate drainage, ranging from a minimum of 0.5 per cent. to a maximum of from 1.5 to 2.0 per cent. Since most accidents occur to planes within the first few hundred feet after they leave the ground, open spaces to the windward of the airport are desirable for use as auxiliary landing fields. Land marks such as streams, channels, highways, railroads and topographical features which will readily identify the airport from the air to the strange flier, and will assist the familiar pilot in locating the field in bad weather, should exist.

As far as physical features are concerned, the site should be protected from overflow by flood waters and the surface of the landing field should be kept free from mud or standing water at all times. This requires a quick-draining soil of light texture underlain by an open subsoil. Clay or other heavy soils may require expensive tile drainage systems.

It is generally agreed that high tension wires, buildings, poles and smoke-stacks constitute serious hazards and are expensive to remove. Where a field is extensively used it will become dusty in dry weather if the soil is of a "friable" nature, and preventive measures are costly. If the site is located in open uncultivated country, windstorms will cause objectionable dust haze with resulting poor visibility.

The landing area should be covered with turf or sod which calls for a fertile soil and water available for irrigation. Where the soil will not support such a growth the landing strips must be covered with concrete, cinders, slag, gravel, asphalt or other suitable material.

Manifestly shops, hangars and administration buildings should be located to the leeward of the field to permit planes to leave for flight with as little ground travel as possible, and should also be located adjacent to available transportation. If aviation is to become more popular with the average citizen he must become familiar with it and its incidental features. Maddux Airlines, Inc., has reached the same conclusion and adopted it practically by providing park space and other recreational features adjacent to their space on the Grand Central Air terminal between Glendale and Los Angeles.

It is generally agreed that where all aeronautical activities of a community are to be concentrated on one airport, the site of at least 500 acres should be provided and more if a community is large and can afford it. If several

sites are to be acquired, one from 500 to 700 acres should be obtained for use as the major air terminal and industrial field, and others from 100 to 250 acres selected for minor uses. In smaller communities where the use of the port will be limited to a site of from 200 to 400 acres may suffice.

From a purely economic point of view, it is better to acquire too great rather than too small an area as the excess land can be sold at an advance in price but seldom can be purchased after the airport is developed except at a prohibitive price.

Naturally a location where best weather conditions are offered should be selected. In localities where there is little variation in meteorological conditions within a radius of 10 to 20 mi., these conditions must be taken as found. Haze, dust storms and smoke are objectionable. Fogs are one of the greatest menaces. A plane must take-off and land flying into the wind. Sites subject to quickly shifting winds require great care in keeping the runways clear. Because of these factors mentioned, great care should be exercised in locating an airport.

A municipal airport also should be located in such a position that flying over the residential section of a community can be kept at a minimum. Cities generally prohibit air travel except at relatively high elevations over residential areas and this restriction will impair the usefulness of any field located either within or near such an area or in the line of expansion of such development.

One of the most important considerations to bear in mind is that an airport should be located adjacent to surface transportation, close to rapid transit lines and to a major highway. Automobile bus lines supplement rapid transit facilities and are a feature of added value.

To be of maximum value, a municipal airport must be accessible to its community. Naturally air transportation will continue to be dependent upon the element of time saved over ground transport. Present air schedules average about 100 mi. an hour and before long these schedules will be increased materially.

An air view of the Worcester, Mass., airport. The white lines indicate the crossed runways.

For short distances between two points the time saved by air over rail transport at present is small. Curves have been worked out to show that great saving occurs only on long hauls, probably in excess of 500 mi. for passenger travel and 1,000 mi. for other cargo. The curves also show that undue weight often is given to the necessity of locating an airport close to the business center. Land values decrease in general with increase in distance from the center of the community. As Mr. Baker suggests, a careful study should be made of the relationship between the time saved through selection of a close in site against the increased cost of such a location.

Naturally police protection and regulation should be available on the airport, and development of the surrounding area must be subject to such control as will prevent encroachment of obnoxious industries or residential areas which will impair the usefulness of the field. A port need not be located within the political elements of a city, and adequate control can be maintained outside those limits.

Other thoughts with reference to locating a municipal airport are that any site considered should have available for use upon it electric power, water, fuel, telephone and telegraph connection and it should be readily accessible to supplies of gasoline, oil and other commodities. Facilities for fire protection should be made available.

Also, in order to afford a proper basis of comparison between different sites under consideration, and to evaluate time saved in considering the advantage of a close in site, consideration should be given to cost of land; cost of grading; leveling, surfacing, draining and tiling; cost of removing hazards and obstructions; cost of bringing proper transportation and traffic facilities adjacent to site; cost of bringing necessary utilities adjacent to site; cost of providing adequate fire protection; cost of financing, condemnation, etc.

In his studies Mr. Baker has concluded that, according to a table arranged by him, any airport falling below the seventy per cent. rating would be unsatisfactory. Each site should be considered separately from each of the 10 standpoints noted below and given a rating on the following basis: *Excellent,* 90 to 100%; *Good,* 80 to 90%; *Fair,* 70 to 80%; *Unsatisfactory,* Below 70%.

Little consideration should be given a site where factors "c" and "f" in the table below fall below 90 per cent., or factors "a," "b," or "e" fall below 80 per cent.

Since not all of the factors considered are of equal importance they are given different weights. Those given in the following tabulation are suggested as suitable of application where a single airport is to be selected and used for a major traffic terminal.

Factor		*Weight*
a.	Topography	10
b.	Physical features	14
c.	Meteorology	14
d.	Location with respect to community served	10
e.	Transportation facilities	11
f.	Accessibility	11
g.	Legislative control	5
h.	Utilities available at or near site	5
i.	Cost	10
j.	General desirability from all standpoints	10
	Total	100

By multiplying the percentage rating given each factor for the site under consideration into the weight assigned that factor, and taking the total of the resulting figures, a final rating for each site can be arrived at. The weights given above may be varied somewhat, depending upon the use to which the site is to be put and similar matters.

No Demagnetization

The Results of an Experiment Conducted Determine the Effect of Booster Operation on the Service Magneto

By T. Z. FAGAN
Vice-President, Scintilla Magneto Co.

THERE appeared in the January 12 issue of the magazine "Aviation" an article by A. H. Packer, purporting t oshow, by certain tests conducted, that the high tension energy from the booster magento might demagnetize the rotating magnet of the service magneto when this high tension energy was introduced through its booster circuit.

The following is presented to correct the impression, that may have resulted from the article referred to, that the rotating magnet could be demagnetized under such circumstance.

Referring to the diagram. It is not at all improbable that when the booster circuit of the service magneto "A" is used under abnormal conditions such as excessive spark plug gaps, disconnected ignition cables or excessive compression ratio that the booster energy will flash-over from the booster segment "B" to the service segment "C" of the distributor cylinder "D" by way of the distributor block electrode "E," thence through the secondary winding "F" of the coil "K." The important fact is, however, that under this flash-over condition the rotating magnet is not in any way affected.

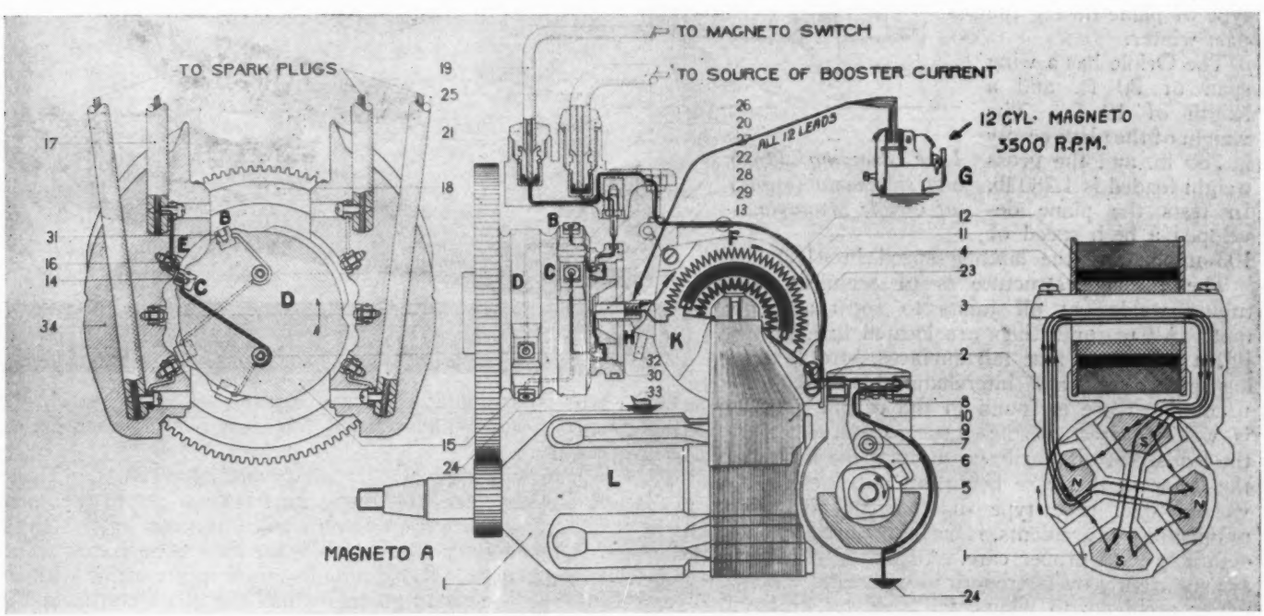
The following demonstration was conducted, and we again refer you to the diagram at the bottom of the page.

A twelve cylinder standard aircraft magneto "G" was operated at a speed of 3,500 r.p.m. producing approximately 233 sparks per second. The twelve leads of this magneto were connected to the high tension outlet "H" of the coil "K" of a nine cylinder standard aircraft magneto "A," which was driven at a speed of approximately 100 r.p.m.

The rotating magnet "L" of magneto "A" was measured to determine its magnetic strength before it was submitted to this demonstration. After five hours of continuous operation of this setup, the rotating magnet of magneto "A" was again measured and showed no loss of magnetic strength.

In the light of a subsequent investigation, it was found that approximately six times the energy of magneto "G" would be required to cause any appreciable demagnetization of the rotating magnet.

Naturally at the inception of the design of the magneto under discussion, it was determined that the introduction of high tension energy through the booster mechanism to facilitate starting of the engine could not cause demagnetization.



1 Rotating magnet, 2 Pole shoes, 3 Care of coil, 4 Primary winding, 5 Breaker cam, 6 Breaker lever, 7 Breaker lever axle, 8 Long contact point (insulated), 9 Main spring for breaker lever, 10 Short contact point, 11 Condenser, 12 Secondary winding, 13 High tension carbon brush, 14 Segment in distributor cylinder carrying secondary current, 15 Distributor cylinder, 16 Electrode in distributor block, 17 Ignition cable, 18 Large distributor gear, 19 ground wire, 20 Booster and ground connection block 21 Fastening screw for ground wire, 22 Stud for ground contact, 23 Primary bridge, 24 Ground through the magneto and engine, 25 Booster cable, 26 Fastening screw for booster wire, 27 Electrode for booster current, 28 Collector ring for booster current, 29 Fastening screw for collector ring (in booster circuit), 30 Fastening screw for collector ring (in secondary circuit), 31 Segment in distributor cylinder carrying booster current, 32 Safety gap electrode, 33 Ground plate for safety gap, 34 Distributor block.

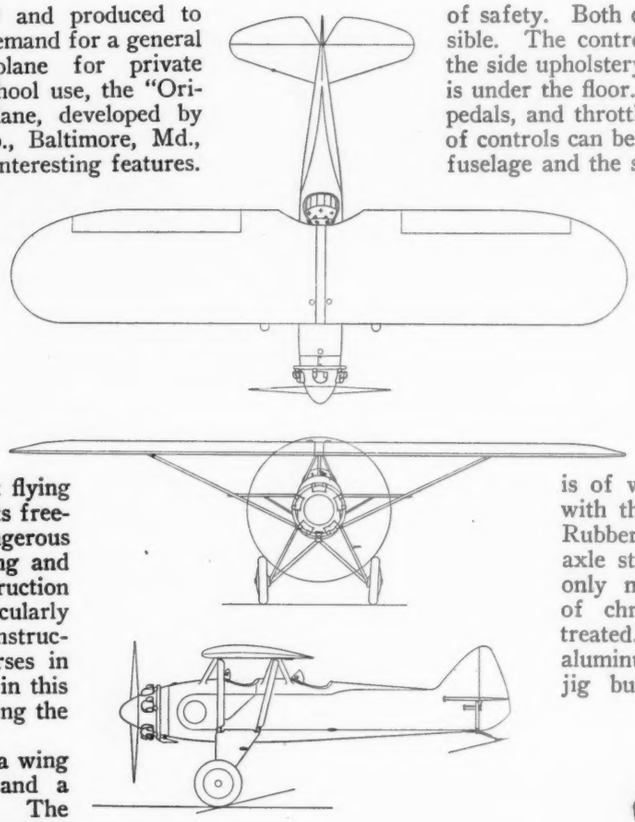
The "Oriole" Monoplane

Le Blond Powered, Tandem Cockpit, Parasol Type Craft Was Designed for Sport and Student Instruction Purposes

DESIGNED and produced to meet the demand for a general purpose plane for private ownership and school use, the "Oriole" O-2 monoplane, developed by Doyle Aero Corp., Baltimore, Md., embodies several interesting features. The Oriole is a tandem cockpit parasol type powered with a LeBlond 60 air-cooled engine.

During a period of test flights extending over several months, the Oriole has given proof of excellent flying characteristics. Its freedom from dangerous tendencies in flying and its rugged construction make it particularly adapted to use in instruction. Several courses in flying were given in this type of plane during the past winter.

The Oriole has a wing span of 30 ft. and a length of 19 ft. The weight of the plane empty is 780 lb. and the gross weight loaded is 1,280 lb. In tests the plane developed a high speed of 103 m.p.h. and the landing speed in 41 m.p.h.



Line drawing (top) and side view (right) of Oriole Monoplane

The fuselage structure is of seamless steel tubing welded at all joints to form a single unit. All major fittings are located in a master jig, a guarantee that tail surfaces, struts, landing gear, etc., are interchangeable. An unusual departure is found in the cabane structure which is welded direct to the fuselage and designed to take the loads that ordinarily go through the left top longeron, the latter in this case being cut out for the door. The welded steel tube type of construction affords maximum safety in accidents, is easily repaired and will last indefinitely with proper care. All major joints and fittings are sufficiently over-strength to withstand without damage minor accidents to wings, tail surfaces or landing gear. The fuselage structure is faired to a good streamline form with sheet duralumin and the whole fuselage is covered with fabric. Easy access to the front seat is insured by a large door opening the full depth of the fuselage. In the event of a nose over, the cabane structure is designed to carry the full load of the airplane with an ample margin of safety. Both cockpits have been kept as clean as possible. The control wires to the rudder are kept within the side upholstery and the torque tube between the sticks is under the floor. Dual controls including sticks, rudder pedals, and throttles are standard equipment. Either set of controls can be quickly disconnected. The sides of the fuselage and the seats are well upholstered and the latter have cushions that can be removed when a parachute is to be used. A full set of instruments is standard in the rear cockpit with an altimeter only in the front one. When the plane is to be used for school work, a full set of instruments can be included in the front board.

The engine cowling is in two sections held in place by automobile type latches. The landing gear is built in a jig to insure a free fit. It is of welded chrome molydenum steel tubing with the outside structure faired with fabric. Rubber cord shock absorbers are used. The axle strut with one bearing at the top is the only moving part of the gear. It is also of chrome molybdenum steel and is heat treated. Wheels are streamlined with spun aluminum discs. Tail surfaces are also jig built. Tubing is used for front and rear spars and ribs are formed of sheet steel. A spring tail skid is used requiring little attention in service.

The wing is made in two panels joined at the cabane. A qtuickly removable metal fairing strip covers the opening. Spars are of selected spruce, the rear ones being a full rectangular section while the front one is routed between fittings. Ribs are built up of spruce strips with reinforcing plywood gussets which are glued and tacked in place. The true contour of the leading edge is maintained by a thin sheet of duralumin covering the whole nose forward of the front spar. The standard drag strut is a welded steel tube truss with fittings for the conventional hard wire internal drag bracing. Double drag wires are used and have been kept as far apart as possible to in-

Top and Bottom: Two views of the Le Blond powered Oriole Monoplane. Left: The well streamlined nose of the plane showing the exhaust ring installation.

sure the utmost rigidity in the unbraced portion of the wing. An aluminum tube gives the wing tip its eliptical shape. In the root of each wing there is a 12½ gal. welded gasoline tank with shut-off valve where it can be conveniently reached from the cockpit. These two tanks are of great value as a safety feature. In take-offs and landings, the Army practice of turning on both tanks is recommended. In flight one tank can be turned off and held in reserve. Wing struts are of large diameter steel tubing faired with balsa wood.

The standard color is black and the special Doyle Aero yellow. Other color schemes can be had on special order. Berry Brothers' dopes and lacquers are used throughout and are applied by the new Berry Brothers' process.

The Oriole was designed by Harvey Doyle, who it may be remembered designed the "American Moth" of 1928. Raymond J. Crowley of the University of Detroit is in charge of stress analysis and general engineering work. Wilson K. Doyle has assumed the duties of general manager of the new company. He has acquired several men with whom he was formerly associated. Robert Paddock is superintendent of the new plant and Delos Cassety is foreman of the wing department.

Production is now going forward in a small but modern plant, with carefully selected men who have had much experience in this particular field of aircraft work. An adequate layout of machinery has been installed and complete sets of accurate and carefully made jigs are proving their value in speedy final assembly with all parts fitting freely.

The general specifications as supplied by the manufacturer are as follows:

Span	30 ft.
Wing area	165 sq. ft.
Length	19 ft.
Weigt, empty	780 lb.
Weight, loaded	1,280 lb.
High speed	103 m.p.h.
Landing Speed	41 m.p.h.
Power plant developing 65 hp. at 1,950 r.p.m. LeBlond 60	
Fuel consumption	5 gal. per hr.
Fuel capacity	25 gal.
Oil capacity	3 gal.

Ignition Shielding *for* Radio Operation

By LAWRENCE A. HYLAND
Radio Engineer

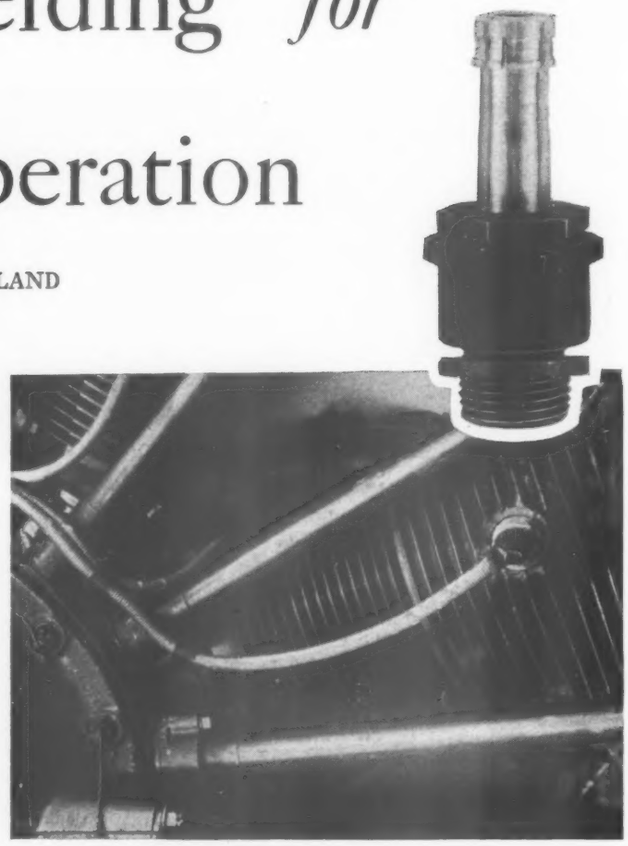
UNTIL recently, the sensitivity of the receivers which might be employed on aircraft had not been increased appreciably since 1918. While several factors have contributed to this surprising situation, the underlying cause has been the electrical disturbance caused by the engine ignition system.

The elimination of this disturbance has been attempted with little success by many organizations during the last decade. The chief difficulty has been, not the elimination of the interference, but the achievement of some method which would solve the problem without impairing the efficiency of the ignition system or unduly increasing the weight or space required for the radio receiver.

Known as "ignition interference" this disturbance produces in the phones a crackling noise very similar to strong steady summer static. Ordinarily the amplitude of this artificial static is such that the required signal must be many times what is necessary to overcome external noise. Another result of ignition interference important in aircraft telephony is the distortion of the detector output which causes voice reception to be garbled badly.

A brief analysis of the ignition system from the viewpoint of the radio engineer will assist in the formation of a true picture of the problem. Aircraft are propelled by gasoline engines which employ an electric spark to ignite the compressed explosive mixture in the cylinders. To produce the spark a high tension magneto or equivalent is used. In the usual case a breaker in the primary circuit of an induction coil is opened when the current in the coil, due to the position of the magneto inductor, is at a maximum. The sudden break causes the lines of force around the coil to collapse rapidly and a potential is built up in the coil secondary sufficient to break down the gap between the electrodes of the spark plug to which the secondary is connected.

The schematic representation of the secondary circuit shows each spark plug and its connecting wire to contain all of the elements of a simple spark transmitter. The high tension wire has some inductance due to its length and considerable capacity to ground, while the plug may be classed as an ordinary open spark gap operating under pressure. Each of the ignition high tension circuits on an engine periodically goes through the cycle of events which occurs in a spark transmitter when the key is depressed. The capacity is charged to the point at which the gap breaks down, current then flows in the ionized gap, first in one direction and then the other at a frequency determined by the circuit constants. When the losses through energy dissipation reduce the potentials in the oscillating circuit to a point below



Top: An integrally sielded spark plug. Bottom: Spirally wrapped high tension lead feeding a shielded plug.

that which is necessary to maintain current flow across the ionized, but nevertheless high resistance gap, oscillation ceases but a D.C. arc sustained by the secondary discharge persists for some time.

The oscillations of a spark system, particularly of an open gap system, are of a vicious character. The high damping of the radiated wave causes every circuit in the vicinity, regardless of its frequency, to be excited by impact. This, together with the substantial amount of power radiated by the airplane ignition system, causes severe local interference which, in not unusual cases, may be heard at ground stations for distances up to a few miles, especially if the receiver be tuned to the higher frequencies.

Another circumstance affecting the problem is the variable nature of ignition interference. No two planes of the same type seem to have identical interference phenomena. There is some evidence that standing waves are set up in parts of the airplane structure which, if true, would explain much of the variation. Even similar engine installations do not produce similar interferences though this can be explained by slight differences in high tension wire position, cylinder compression and gap distance. The variable nature of ignition interference cannot be stressed too highly. Certain general types of aircraft which seem to have all of the elements common in planes showing normal amounts of disturbance are apparently free from interference. Other types in which the structure and wiring appears to be favorably disposed and which, therefore, should show a

very low interference level are actually very bad. Hence a comprehensive study of ignition interference phenomena cannot be carried out on a single plane or on a single type of aircraft, but must be pursued on several of each of the general types of airplanes in use.

To complete the picture there must also be considered an interference of another nature called microphonic noise and really caused by vibration, but which is frequently confused with ignition noise. Microphonic noise appears in exaggerated form in most of the military and many of the commercial types of aircraft and may be transmitted to the receiver through the structure of the plane, or by the medium of strong sound waves which strike the case of the receiver. In the latter case the box often acts as a resonator with a further increase in the amplitude of the disturbance.

Several years ago it became evident that the existing receiver sensitivity was inadequate to the demands of the Naval service, particularly for the long range scouting planes and for direction finding from all types of aircraft. Consequently the Naval Research Laboratory was directed to make an exhaustive investigation of the possibilities which might lead to the reduction of ignition interference preparatory to the design of more effective receiving equipment.

Since the reports of previous investigations indicated that widely diverse results had been obtained with substantially identical equipment it was decided to repeat many previous experimental efforts as well as to develop new lines of inquiry.

It soon became evident that some standard of comparison must be set up. There was little quantitative or comparative evidence available which gave an estimate of the amount of interference usually experienced or which differentiated between interference due to external noises and that due to ignition or to microphonic noises. Accordingly a very simple and compact type of vacuum tube voltmeter was developed which was called an "ignition meter." Since the function of the ignition meter was to measure the amplitude of the signal impressed on the ear, the instrument was designed and calibrated to indicate voltages substantially proportional to the frequency response curve of the ear. Thus between 500 and 1000 cycles the indicated voltages are true but at the higher and lower frequencies the voltages are attenuated before reaching the indicating device. Placed in parallel with the phones the meter gives an excellent measure of the sound impressed on the ear by the headphones.

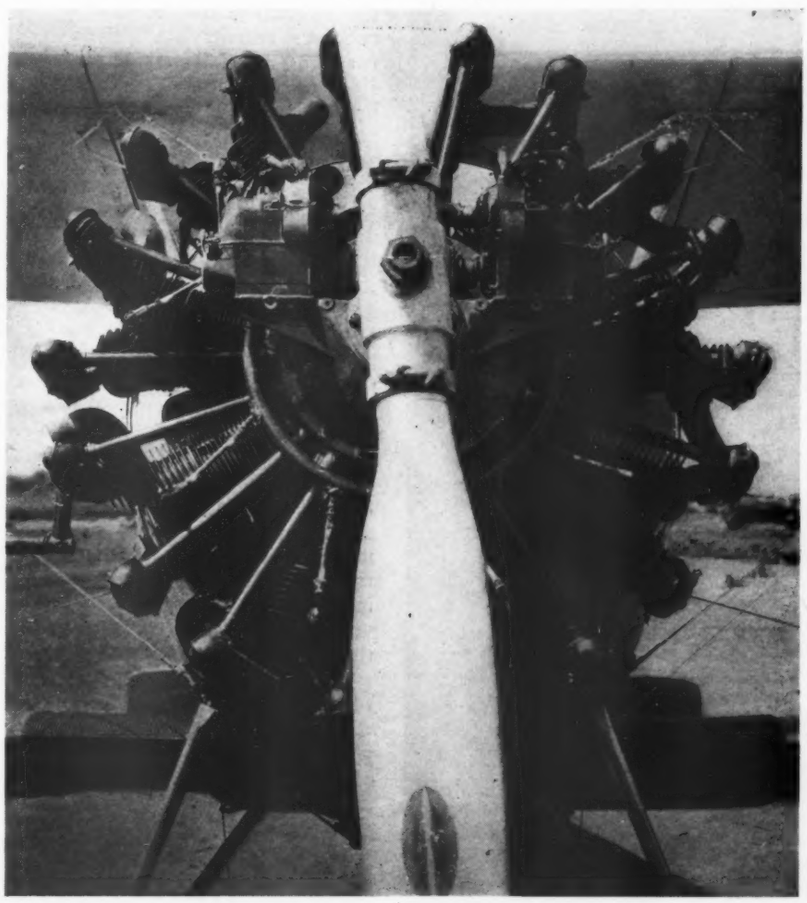
Through the use of the ignition meter it was made practicable for the first time to arrive at a true estimate of the various radio disturbances encountered in flight, to ascertain the very high values which these interferences might reach, and to make ground setups which would very nearly duplicate flight conditions.

The reduction of ignition interference and the elimination of static are two problems which have many common attributes. In the latter field an enormous amount of research has been carried out, hence liberal use was made of the literature and of the cricuits having to do with the suppression of static.

There are, of course, many methods by which radio disturbances of all kinds may be reduced. The more successful schemes are usually bulky and heavy and entirely unsuited to aircraft conditions. Those which could be adapted in any way to the demands of the problem we investigated, in particular the various kinds of wave traps, tuned circuits, counterpoise systems and balanced circuits, were tried. No benefit, however, was derived from any of these arrangements. The highly damped wave radiated by the ignition system is of a character which readily excites any circuit by impact regardless of traps and tuning.

With respect to the methods for balancing out the interference it may be stated that the problem is nearly identical with that met with in static suppression. Not only are the interfering waves bad in form but they emanate from a variable source. It is always possible to balance out the radiation from a single spark plug and its connecting wire. But an airplane engine may have from eight to twenty-four or more spark plugs and high tension wires. Each of these is radiating at its own frequency, at its own intensity and from its own position. Therefore, each plug and wire must have its own neutralizing system, a most complicated requirement which cannot be met.

Thorough shielding of the receiving system is of no benefit in the

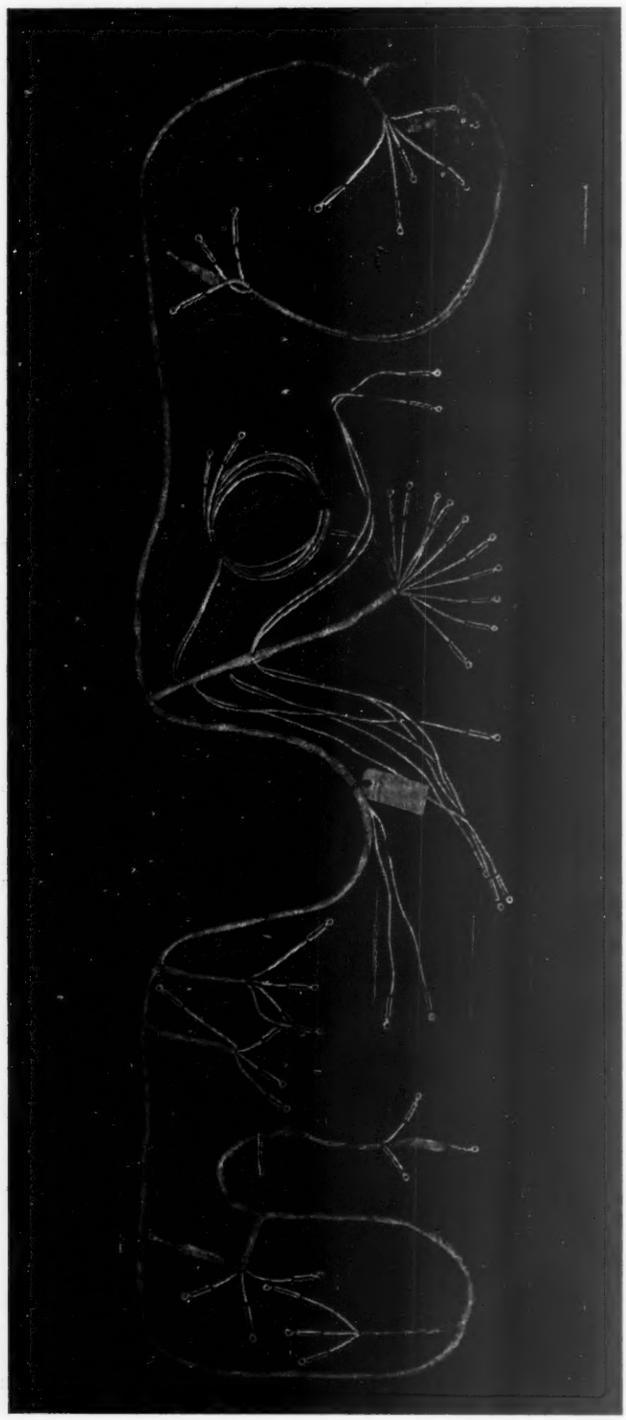


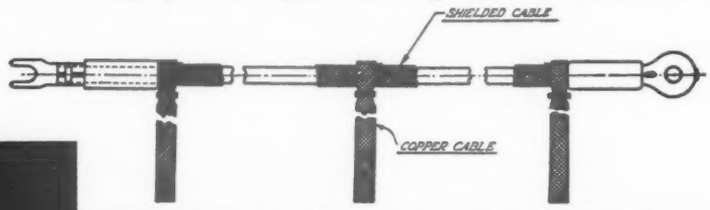
A Wright J-5 engine having magneto and switch caps, braid and shielded spark plugs to replace standard harness.

suppression of ignition noise. Practically all of disturbing pickup is made through the medium of the antenna. A very small percentage is attributable to the use of incomplete receiver shielding, uncovered batteries and connecting batteries. It is manifestly impossible to shield the antenna so that shielding of the receiving system offers no appreciable gain.

Though little success was anticipated, it was deemed advisable to tune the ignition system to definite radio frequencies in the hope that such accurately tuned emissions might be trapped out or neutralized more easily. Accordingly the ignition system was adjusted to several frequencies in the high and intermediate frequency spectrum and the balancing and trapping investigations repeated. Again no improvement was noted and radio frequency balancing and trapping was definitely abandoned.

The previous work having been concerned entirely with the radio frequency circuits, detector action was next examined. It soon appeared that the distortion of the detector output is occasioned by the high peak voltages due to ignition wave form. Especially in the case of grid leak and condenser detection are these peak voltages damaging for the condenser receives a charge which is slow to leak off and the tube is momentarily blocked. Distortion is somewhat corrected by the use of comparatively low resistance grid leaks, but the sensitivity of the receiver is much impaired. Even with detection by plate rectification the voltage peaks are such as to throw the tube off its operating characteristic and distortion results, though of lesser degree than with normal grid leak and condenser detection.





Top: Shielded low tension wire. Bottom: Cable harness made by the Belden Manufacturing Co.

The amount of radio frequency amplification and the operation of the detector tube are the criteria of receiver sensitivity. Thus it may be seen that the forgoing work resulted in no means for the suppression of ignition interference, or of the effects of ignition interference, which would allow increased receiver sensitivity. The amount of radio frequency amplification permissable was determined by the limiting detector peak voltage input which could be handled without distortion.

In the operation of standard naval receivers through conditions of radio and static interference it has been found desirable to use tuned audio frequency circuits. An adaptation of the standard Naval equipment was applied to an aircraft receiver and proved to be surprisingly effective. Low frequency disturbances, whether of electrical or vibrational origin, were almost entirely suppressed with but little loss in the strength of the desired signal. The required sharpness of tuning limits the use of the device to radio telegraphic or fixed audio frequency modulation reception as the device would, by reason of its audio frequency selection, make telephone signals unintelligible. More recently the Bureau of Standards in its beacon receivers has found its visual reed indicators used in connection with the radio beacon, will function when the beacon signal is only one-third of the total disturbance. This is entirely in line with the results of Naval practice as the vibrating reeds are a mechanically tuned audio system.

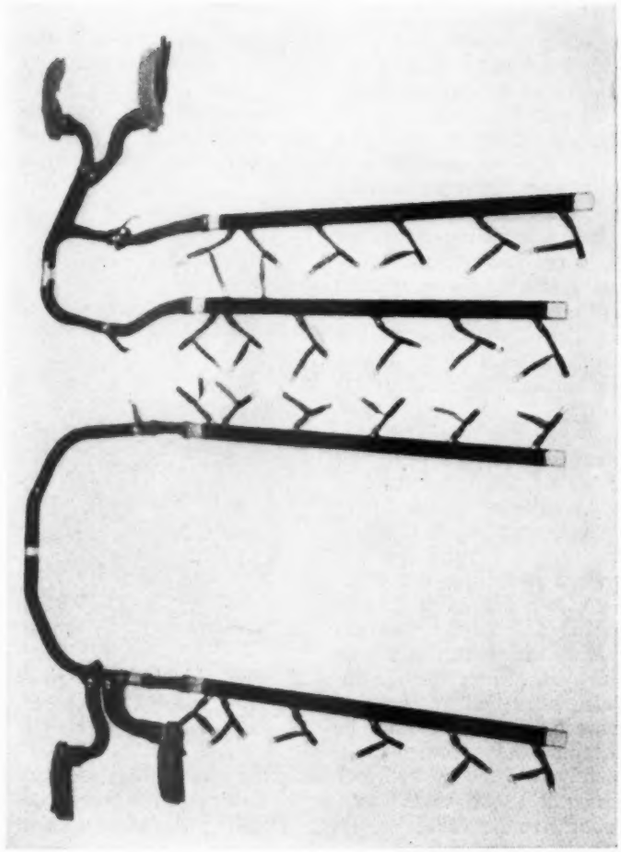
The work reported on above completed the first phase of the investigation into ignition interference, and led to the following conclusions:

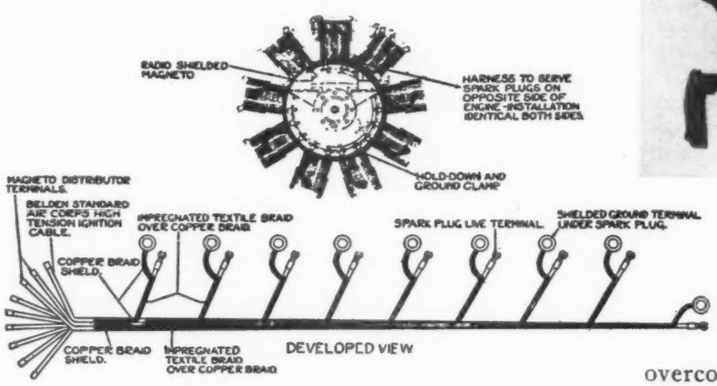
(1) That shielding the radio receiver was of no benefit.
(2) That the use of an insulated counterpoise was not warranted.
(3) That any means of suppression in the receiver radio frequency circuits was not feasible.
(4) That detector distortion imposed a definite limit on receiver sensitivity.

(5) That tuned audio frequency systems formed a satisfactory means for the suppression of the disturbances which had passed the detector.

Turning now to the other side of the investigation which had to do with those remedies to be applied to the engine ignition system. Shortly before the commencement of this phase of the work a paper appeared in a German technical publication outlining the specifications for a type of high tension lead which would completely eradicate the evils of ignition interference. The scheme comprised the substitution of lengths of oxidized or rusty chain for the usual ignition wire. An extended mathematical analysis of the method proved that complete suppression could be obtained. Following the directions a harness composed of lengths of rusty chain was prepared and installed. At the conclusion of the tests it was admitted that there was entire suppression of the interference. Nor was there any engine exhaust noise during the tests. In fact, there were no disturbances of any kind other than those experienced by the mechanics when the engine would not fire. If started and brought up to speed with an ordinary harness on one set of plugs the motor would stop immediately when the chain harness was switched on.

The suggestion was, however, used as the basis for an extensive study of methods for damping out the oscillating component of the ignition current. The results from all methods were very uniform and may be summarized by stating that in all cases the reduction in ignition interference is accompanied by a corresponding reduction of ignition current with consequent decreased engine reliability.




RADIO SHIELDED MAGNETO
HARNESS TO SERVE SPARK PLUGS ON OPPOSITE SIDE OF ENGINE—INSTALLATION IDENTICAL BOTH SIDES
HOLD-DOWN AND GROUND CLAMP
MAGNETO DISTRIBUTOR TERMINALS
BELDEN STANDARD AIR CORPS HIGH TENSION IGNITION CABLE
IMPREGNATED TEXTILE BRAID OVER COPPER BRAID
SPARK PLUG LIVE TERMINAL
SHIELDED GROUND TERMINAL UNDER SPARK PLUG
COPPER BRAID SHIELD
COPPER BRAID SHIELD
IMPREGNATED TEXTILE BRAID OVER COPPER BRAID
DEVELOPED VIEW

Top: A Belden high tension shielding unit for Curtiss D-12 engine. Bottom: A radio shielded high tension ignition harness for a nine cylinder radial aircooled airplane engine

Having demonstrated that the conductance of the ignition system should not be tampered with, attention was turned to shielding. That shielding would suppress ignition interference was common knowledge. That shielding must be classed as a temporary expedient which frequently caused ignition failures was also common knowledge. Study of the situation disclosed, however, that the judgments on shielding had been pronounced years ago when the makeup of the airplane ignition system was vastly different from that which now exists.

Practically all of the early shielding efforts were conducted on the Liberty engine which has a notoriously weak ignition system, though one which was a marvel of its day. The output of the Liberty coil secondary is barely sufficient to send a spark across the gap in the plug under ideal conditions. If an additional capacity is introduced in the form of a tight metal shield over the individual ignition wire there was too much energy diverted to the charging of this new capacity and no spark would jump across the gap in the plug. The Army in its efforts to overcome this situation designed a large metal duct which carried all of the high tension wires. The capacity between the wires and the duct was much lower than with individual shielding and better operation was obtained. The arrangement was bulky, heavy and difficult in maintenance and quite unsuited to flight conditions.

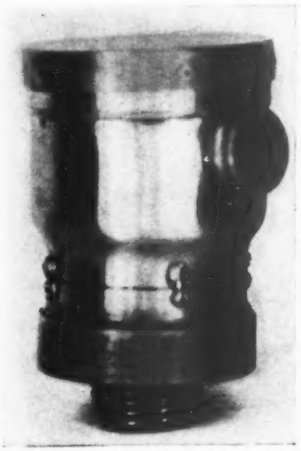
Ignition wire insulation was extremely poor in quality compared with the present products of the cable manufacturers. Nearly all of the types employed rubber of varying degrees of purity with no protective covering. Under the happiest conditions insulation breakdowns were frequent and with metal sheathing offering a good path to ground throughout the length of the wire, insulation troubles were greatly multiplied. At the corners where corona developed, the poor grade of rubber was rapidly oxidized with subsequent cracking and ultimate breakdown.

Modern high tension wire is a much superior article than that described above. The insulation is composed of the finest rubber carefully compounded and controlled in production, with a covering composed of a layer or two of varnished cambric or lacquered cotton braid. These outside elements not only give mechanical protection but also have the property of corona proofing the wire. With tight metal sheathing applied over these newer wires having high grade insulation there have been no breakdowns in hundreds of hours of operation.

Magneto ignition is almost universally employed

at the present time. The usual high tension magneto of sound design has a large power reserve and the added capacity of the wire to the shielding actually results in a hotter spark.

These facts having been unearthed and demonstrated, ignition shielding seemed worthy of a new .rial. An installation was made and from the ignition standpoint the results were all that could be desired. After a hundred hours of flight time no noticeable deterioration of the insulation had taken place, the sheathing actually adding to the life by reason of the better mechanical protection it afforded.



A plug shield for engines having small clearances around the plugs.

From the radio standpoint the results were not at all successful. Little, if any, decrease in the interference was noted. During the test the entire ignition system including the magneto, low and high tension wiring and switch, but excluding the spark plugs, was shielded. Since earlier investigators had shown that material benefit could be obtained only from a completely shielded system including the spark plugs, the test was not to be called an entire failure but merely corroborative of earlier results. Pending the development of a practical method of shielding the one remaining offender in the ignition system, the spark plug, the metal covered wire was left on the plane for a life test.

An examination of the art will disclose that there have been many shielded spark plugs or spark plug shields. Their history dates back to the first application of marine gas engines when shields were applied to keep water off the plugs. But prior to this present investigation all shielding methods for spark plugs were so flimsy or bulky as to preclude their use on engines in flight, or else lacked the necessary electrical insulating and heat radiating properties absolutely essential in high compression engines with powerful ignition systems.

The fundamental idea for the first practicable type of shielded spark plug was original with engineers in the aircraft section of the Naval Research Laboratory. Upon disclosure of the design, the Navy, under an experimental contract, authorized the B. G. Corporation to proceed with the construction of enough samples to supply a single engine.

Since only a slight modification of the standard plug was required the special plugs were quickly available and were at once installed on an engine.

The plane chosen for the sample shielded spark plugs was one in which demonstrated abnormal ignition interference had not been materially changed by the application of the usual shielding. With the addition of the shielded plugs, however, the ignition interference was entirely suppressed.

In checking the performance of these plugs the most sensitive of the receivers available at the Naval Research Laboratory were installed on the airplane and in no case was ignition interference identified. As a final test a supersensitive high frequency receiver was employed and the receiver tuned to the natural frequency of the ignition system. This represented the theoretical worst condition which might ever be met with in aircraft radio operation. Again the complete shielding and shielded spark plugs proved to entirely suppress the ignition disturbance.

Flight work with the complete shielded ignition system proved that entirely new standards of radio performance could be achieved and that the ranges of existing radio receivers was increased 100 per cent.

An interesting verification of the effectiveness of the shielding was made by removing a single shielded plug and replacing it with an ordinary plug, taking care to leave undisturbed the shielding around the ignition wire. The result was quite marked, a popping sound at intervals corresponding to the firing of the single unshielded plug being heard in the phones.

Many of the original samples of shielded spark plugs, while now obsolete are still in the engine and functioning well. Slight defects in terminal arrangements developed which were quickly recognized and which were or are being corrected. The present status of the shielded spark plug is one of absolute practicability. Few, if any, changes in the basic design are necessary to permit of its production in quantities.

As a by-product of the radio interference elimination these shielded spark plugs and their terminals will be waterproof and by reason of the largely increased radiating surface, will offer to the spark plug engineer entirely new possibilities for cooling.

The elimination of ignition interference, therefore, demands that the entire ignition system be enclosed in a metal sheathing, a requirement that becomes essential if the newer receivers with their increased performance are to be utilized. Fortunately, it is now comparatively easy to apply and to maintain shielding. In many cases the engine manufacturers are supplying complete shielding of all units save only the spark plugs. Forward looking cable manufacturers are in the market with excellent shielded high and low tension wire, magneto manufacturers are encasing their products in metal with provision for joining to the wire shielding, switch makers are providing covered rear ends for the switches and new designs of engine starters include a booster magneto which can be shielded readily. Rapid development assures that shielded plugs will be available within a few months.

It should be emphasized that no one unit of the shielding is more essential than another. Any wire or device in any way connected to the ignition system must be shielded or the entire system is ineffective for the suppression of ignition noises. A single unshielded plug will introduce undesirable loud popping noises in the receiver while a neglected booster lead will cause a general scramble of interfering noises to be impressed on the operator's ears. On the other hand, such electrical parts of the aircraft as lighting and other auxiliary wires energized from a separate battery or generator may safely be left unshielded, provided their leads do not run parallel to the ignition wires for material distances.

This investigation has provided a rich fund of information on many phases of aircraft radio reception. The excellent characteristics of the aircraft trailing or vertical antenna are better appreciated, methods for the elimination of vibration noises have been developed, and the causes and effects of ear fatigue carefully examined. With the chief disturber eliminated and the lesser disturbances on the run it is confidently expected that aircraft receiver performance will shortly be comparable to that obtained on the ground with heavier and bulkier equipment.

Aviation *in* Siam

Splendid Market for Planes, Engines and Accessories Is Opened By Aero Development in This Eastern Kingdom

By ANDREW A. FREEMAN

THE idea of an efficient air force is incompatible with the picture which the average citizen carries in his mind of Siam. Somehow, Siamese twins and white elephants do not belong on the same canvas despite the modern trend in art. Out of place as these elements may be, the Siamese, like Americans and Europeans, are air-minded, and it did not take a Lindbergh or a Byrd to convince them that the time had arrived to give up elephants for airplanes.

The Siamese took to the air long before the world in general had given any serious attention to trans-Atlantic flights or round-the-world hops. In fact Siam's railroads were still in their infancy and people wondered if it were safe to ride behind the "puffing black monsters" when a small number of Siamese army officers were pioneering the air.

The efforts of that little group, spurred as they were by the aviation boom which the World War brought, have resulted in the now well-organized Siamese Royal Aeronautical Service which, as a division of the Ministry of War, builds its own planes, trains its pilots, lays out flying fields, delivers mail, merchandise and medical aid, when needed, to practically all districts of the country.

Long distance fliers of nations who have winged their way from European cities over the far stretches of India to Java, Indo-China, China and Japan, have been loud in their praise of the efficiency and organization shown by the Siamese in aviation. The main airdrome at Don Muang, about 15 mi. from Bangkok, the capital, has been mentioned as being among the best-equipped flying fields east of Suez. Although Brock and Schlee, and Costes and Lebrix were scheduled to refuel at Don Muang, they eliminated that stop due to exigencies of schedule which forced them to push on further.

Siam's activities in aviation are not on a par with those in Europe and America, but comparatively, the people of the Land of the White Elephant are not behind the times with respect to air travel. It is true that equipment is not in step with the latest developments, but the country is getting all it can from what it has and is looking ahead toward improvements.

King Prachatipok, the present ruler, a modern and progressive administrator who has studied and travelled extensively in Europe and America, is most enthusiastic about his country's air force and is encouraging a greater interest in aviation among his people. Appropriations have been growing larger every year and the Siamese, as a result, are going into the world's aviation market to buy planes, engines and accessories in ever-increasing quantities.

The constant expansion of the Siamese Royal Aeronautical Service offers an excellent outlet for American manufacturers. Due to America's great growth in aeronautics in the last five years, Siamese aviation officials have been forced to give some attention to American products, but such attention, at present, is in the curiosity stage, since Americans have done little or nothing in the Siamese market. The British get the orders. Siam and other Oriental countries are flooded with propaganda singing the praises of this British engine and that British engine which British agents never fail to follow up. In the latter part of 1928, however, an American engine made its bow in Siam when an order for several Wright "Whirlwinds" was given. The order did not come of its own accord but only after keen competition had been offered by British manufacturers.

The Siamese are anxious to use American goods not only for the needs of aviation but for all branches of commerce and industry. Efforts are being made to induce American merchants to market their goods in Siam and the few who have looked over the field have been most enthusiastic about prospects. Despite the virtual control of the market by Europeans, which should indicate a high sales resistance to American goods, the Siamese have shown an extreme friendliness toward Americans and toward all things American. As a result native and foreign business houses are anxious to make American connections in order to take advantage of that interest.

One of the most enthusiastic boosters of Siam for American goods is Donald Renshaw, the United States Trade Commissioner who has supervision over that territory. His office is in Singapore but he makes frequent trips to Bangkok for the purpose of studying the Siamese market. He has shown a particular interest in the Siamese air force as a customer for American goods and has made several excellent reports to the Department of Commerce in Washington. In addition, he has strongly recommended the opening of a trade commissioner's office in Bangkok, confident that there is sufficient work for such an official to keep American industries and manufacturers aware of Siam's needs.

Shortly after the Wright brothers had demonstrated the success of their heavier-than-air flying machines, Siamese government officials recognized that aviation was soon to emerge from an experimental stage to play a vital part in the lives of all nations. They intently watched the progress of the Wrights and other inventors and in 1911 took the first step toward the organization of their country's air force. In that year the Ministry of War sent three officers of the Royal Engineers to France to study practical flying. In two years, after a thorough course on the ground and in the air, the men returned to Siam bringing with them materials of aviation.

Without the aid of foreign advisors and engineers, these three men organized a flying corps, and trained pilots and mechanics. Even at that time it was foreseen that planes would play a unique part in the country's transportation service. It was fully realized that railroads could not be built to touch every remote section of the country and plans were then made to link districts untouched by roads. Many towns, isolated by jungle and mountain, requiring weeks of travel via sampan, ox cart

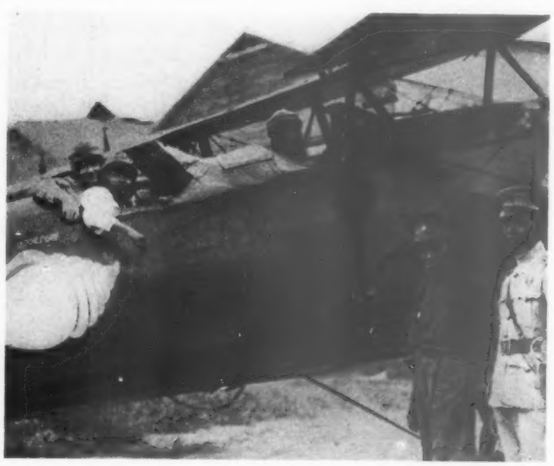
or elephant, would, as a result, be closer to Bangkok, the principal commercial and shipping center.

The Kingdom of Siam in southeast Asia contains over 200,000 sq. mi. and is approximately five times the size of the State of New York with a population of 10,000,000. Its length from north to south is about 1,020 mi. and its widest breadth east to west about 480 mi. The coast line amounts to 1,300 mi. The country is bounded on the north by the French Lao States and the British Shan States; on the whest by Burma, on the southwest by British Malaya and on the southeast by Cambodia, while on the east it is bounded by the French Lao States being separated from the latter by the Mekong River, except in the extreme north where the frontier lies on the west side of the Mekong.

The monarchy is an absolute one, but the executive powers of the King are exercised through various departments headed by responsible ministers. The powers, duties and functions of the ministers are fixed by precedent, by law or by royal decree. Siam is a member of the League of Nations. All old treaties have been revised and practically complete fiscal and jurisdictional sovereignty has been attained.

It remained for the World War to spur the Siamese to develop their air force to its present standard. Immediately after the United States declared war on Germany, King Vajiravudh, now deceased, issued a proclamation declaring his country in a state of war with the Central Powers. Aware of the fact that Siam had already developed a large number of skilled aviators and mechanics, France requested that these airmen be dispatched to the front. Nearly 2,200 young men, as a result, went to France where they remained until the end of the war.

While at the front they were in intimate contact with every new development in aviation and when they returned to their country and rejoined the Royal Aeronautical Service, their experience became invaluable. Plans were immediately made to expand the service. Improvements were effected in the main flying field at Don Muang and new fields were laid out in strategic sections of the country with the result that today there are 15 well-equipped flying fields staffed by experienced men and a similar number under construction. In addition, factories were built at Don Muang for the construction of planes and a large force of men and women were trained in airplane building. Today all parts of the plane, with the exception of instruments and engines, are built by the Siamese people from materials found in their own country. The shops are in full swing daily.



Representatives of the Bangkok "Daily Mail" about to take-off in a Siamese plane from the Don Muang airdrome to "cover" the first news story from the air.

The most suitable type of plane for service in Siam thus far, according to flying officials, has been the medium-sized plane of the Breguet type with a 300 hp. Hisso engine. With the ever-growing increase in airplane travel and extensive plans for commercial air routes between Siam and neighboring countries already well under way, officials are considering multi-engined planes.

Routes are being laid out to connect Bangkok with Singapore and other important Malayan cities as well as with Rangoon in Burmah and Saigon in Indo-China. Merchants of Bangkok are particularly anxious to see inaugurated an airline to Singapore to bring Bangkok closer to the main line of shipping to America and Europe all of which touches at Singapore. The trip at present requires four days by boat and 48 hr. by train.

The airmail service now being operated by Holland from Amsterdam to Batavia with Bangkok as a link in the longest airway now being traveled as a part of a regular route, has helped to stimulate the Siamese to a greater interest in aviation. The coming of the huge tri-engined Fokkers to Bangkok once a week as they make their way to Batavia and return, is instilling into the Siamese a greater desire to bring their own air force to a high degree of efficiency.

The first experiment in Siam of aerial transport of mails took place between the capital and Chandaburi, a town in the southeastern part of the country some 250 km. from Bangkok. The planes took just a little more than an hour to cover the distance, as compared to two days required by steamship to arrive at the same destination. Shortly afterward another route was opened between Bangkok and Korat, 250 km. The planes reached their destination in an hour, whereas by train, which was then the fastest means of transportation, 10 hr. were required. Today most of the country's principal cities have regular air mail services. This particular phase has proved most popular with the people who have indicated their desire to support it with every possible assistance.

Probably no other country uses its air service for the promotion of public health and other humane measures as effectively as Siam. Due to the isolation of many towns and the lack of medical equipment, epidemics took great toll of life until the value of airplanes in relieving such crises was demonstrated.

The most striking case wherein the utility of airplanes was shown for public health work was when an epidemic occurred in Ubol, a province in the eastern part of the Kingdom. Medicines were completely exhausted and the increase of cases grew too great for the inadequate number of physicians at hand. The governor telegraphed the health department at Bangkok that if immediate aid were not forthcoming many would die. The health director telephoned the commandant at Don Muang who promised to have six planes ready for the trip. A special train left Bangkok one half hour later for the flying field with four doctors and nurses and a complete supply of medical neecssities. Within three hours physicians and nurses were busily engaged taking care of the sick.

Royalty was so impressed by the part played by airplanes in this emergency that subscriptions were opened to endow the aeronautical service with additional planes. The ladies of the court contributed a large sum for the construction of additional ambulance planes with a capacity of two lying and four sitting patients.

Although airplanes in Siam may not reach the peak of their usefulness in commercial transportation for some time to come, they have already demonstrated their utility. They have carried pepper, a very important commodity from Chandaburi, a distance of 250 km. and fans made of palm leaves, from Battambong (Cambodia), a distance of 350 km. The transport of silk is carried on by planes in the northern provinces at distances from 300 to 500 km.

The latest use to which airplanes have been put in the past year has been in the making of topographical and cadastral maps by aerial photography. The maps now in existence do not cover one-fifth of the total area of the country. Some of these are still incomplete and have not been revised or have many details missing. The backwardness in this respect is chiefly due to the difficulties of communication by land, and, in some measure, to the lack of personnel and equipment. Such obstacles are now overcome by airplanes which are also used to make photographs from the air in setting out roads and railway lines as well as in irrigation work. Engineers of the Royal State Railways, in surveying new lines, find the airplane indispensable especially in jungle and mountain districts.

Siam is a signatory of the International Aviation Convention and has joined with other countries in the promotion of aerial navigation. The Royal Aeronautical Service has been entrusted with the work of carrying out the regulations of the convention. When Siam's representative returned to Bangkok, a meeting of the Governors of all the provinces was called and a scheme was instituted to set up emergency landing grounds in every district of the Kingdom to be accessible to any national and foreign aircraft in case of a breakdown while flying over Siamese territory. Routes for planes coming from or going to foreign countries were designated and customs airdromes established. A decree was also promulgated regulating the construction and use of aircraft and the capacity of pilots.

The following customs airdromes have been established for planes coming from foreign countries either destined for Siam or passing through the country: Songkla airdrome for craft from the south; Ubol airdrome for craft from the East; Chiengmai airdrome for planes from the west or north.

Don Muang, of course, is the biggest and most important air station in the Kingdom. It has rest houses and canteens to accommodate passengers and crews of visiting planes. Repair shops are always ready for any emergency. There are also signals to facilitate landing and starting both day and night. The equipment includes a meteorological service and a wireless station.

Emergency landing grounds are more than 500 meters in length as well as in width. Each has white, angle-shaped markings at the edges whereas in the centre a white circle with initial letters inscribed can be seen.

Besides these landing grounds, the Government has arranged an anchorage for sea planes at Samud Sakorn by the sea at about 20 km. from Bangkok. Communication with the capital is made by railway or boat.

Siamese flying schools are divided into two sections, primary instruction and the other of advanced flying.

After leaving the primary school, students are assigned to the school of advanced flying where they take long distance flights with medium-sized planes like those used in the postal and sanitary services and for the transportation of passengers. They also perfect their acquaintance with the work of aerial topography.

Before the war, Siam had already many aviators and more than 100 others were added to the number of qualified fliers by those who obtained certificates from flying schools in France. Since the war the Siamese flying school has trained an additional large number of pilots.

There have been remarkably few accidents in flying since Siam took up aviation. From 1913 to the present date six pilots have been killed. Their families are cared for by the Government which provides a monthly pension.

Besides the daily flights, Siamese aviators have made long distance trips. In 1921, two planes, each fitted with a 300 hp. Hisso, escorted French planes to Battambong (Cambodia.) The French fliers had come from Saigon to Bangkok to lay a wreath at the memorial of Siamese officers and soldiers who died for the cause of the Allies. In spite of fog and low clouds encountered all the way due to the rainy season, the planes arrived safely at their destination and returned without accident. In order to return the visit of the French airmen and to express to the government of Indo-China their gratefulness for its friendly action, the Siamese sent four planes to Hanoi (Tonkin) on November 11, 1922, the anniversary of the Armistice. After they had placed a silver plate at the memorial of French officers and soldiers who died in the war, the airmen returned to Bangkok safely after having covered a distance of more than 2,400 km.

Much credit for the thoroughness and efficiency of the aeronautical service is due to the untiring efforts of Maj. General Phya Choloem Akas, the director general. Not only is he an experienced war flier, but an able administrator who never loses sight of the future. Through modern propaganda methods he is creating in the minds of his people a pride in the progress of their aviation corps. It was the writer's privilege to help him in that respect on many occasions while editor of the Bangkok *Daily Mail* in 1927 and 1928 when that paper was owned by the King. We were the first newspaper in the Kingdom to use a plane for editorial work as well as for advertising.

Too much credit in stimulating the interest of Siamese in aviation cannot be given to foreign aviators who have put Bangkok on the world air map by having taken advantage of the facilities offered at Don Muang.

With the encouragement of the King and the constantly increasing interest shown in aviation through Siamese air exploits and the fact that Don Muang has become a permanent airport for international fliers, aviation will continue to grow, new types of planes will be needed as well as engines and other accessories. Siamese want American aviation materials and it remains for American manufacturers to supply that need.

Refueling Van Lear Black's Fokker at Don Muang field on the Amstardam-Batavia flight in the spring of 1927.

Buffalo's Air Display Opens With Big Array of Exhibits

More than 50 Planes and Scores of Accessories Involved

BUFFALO, N. Y.—This city has been looking forward to its big aeronautical display for some time and today, March 23, the doors of the 174th Armory will be opened to the public to inspect the elaborate collection of exhibits which the best efforts of the city's aeronautical leaders have gathered. Planes of all types, engines from almost every manufacturer in this country and scores of accessories have been marshalled for the casual inspection or close study of those whose airmindedness ranges from popular interest to professional ardor. The show will be open one week, closing March 30.

Not only will the latest wares of many manufacturers and designers be displayed but also several machines of historic interest will be given places of prominence. Among these will be the Friendship in which Miss Amelia Earhart made the trans-Atlantic flight. There will be duplicates of the Lockheed Vega type in which several cross-continent records have been made by Art Gobel and Capt. Frank M. Hawks.

Plane Handling a Feature

More than 50 planes have been stationed on the Armory floor. The past few days have seen considerable activity between the Armory and the Buffalo Airport as many planes have been flown to this city, dismantled by the exposition staff, transported through the streets and installed in their allotted places at the exposition hall. This handling of the planes, taken care of by the show authorities, is one of the features of the show from the exhibitors point of view.

The show has been promoted through a committee headed by Maj. John M. Satterfield, who was one of the leaders responsible for building up the local airport. The show has the sanction of the Aeronautical Chamber of Commerce. Considerable interest in the show has been displayed in Canada on account of the location of this city and it is expected that this will introduce an international flavor to the event. Passenger planes will be operated daily on a regular schedule between this city and Toronto during show week for the accommodation of Canadians wishing to attend the display.

Raise OX Command-Aire Price

LITTLE ROCK, ARK.—An increase in price from $3,250 to $3,350 flyaway for its OX-5 powered Command-Aire biplane is announced by Command-Aire, Inc., this city. The prices on this type plane powered with other engines remains the same. According to R. B. Snowden, Jr., president of the company, this advance in price is in line with the policy formulated when the firm was re-organized in October.

Rowland Down In Rebel Land

LAREDO, TEX. — Flying a Cessna plane, Earl Rowland, winner of the Class A Transcontinental Race last year, recently flew south from this city to deliver his craft to a Mexico City concern. Entering Mexico, Rowland was forced down in rebel territory. Government officials, however, rushed repairs for his broken wheel and protected the pilot until he again took the air to fly on to his destination.

Pioneer and P. & W. Service for Chicago

CHICAGO, ILL.—Arrangements have been made with the Pioneer Instrument Co., Brooklyn, N. Y., to establish a complete service department in the Universal hangar at Cicero Field for the repair, calibrating and service on Pioneer airplane instruments.

This repair and service will be under the supervision of a Pioneer Instrument man sent here from the factory. Pioneer will operate under lease from Universal.

In a very short while Universal will have installed very complete engine overhaul in the firm's hangars at 63rd Street and Cicero and will be able to completely rebuild all Pratt & Whitney engines. The company will do this work not only for their own engines, but will completely service and overhaul engines of other operators not equipped to do this work. A complete stock of Pratt & Whitney parts will be carried. The engine overhaul and stockroom will be under the direct supervision of V. A. Jackson, who recently entered the employ of Universal from the U. S. Navy.

May Succeed MacCracken

WASHINGTON, D. C.—As AVIATION goes to press it is reported here from authoritative sources that Maj. Clarence M Young, Director of the Aeronautics Branch of the Department of Commerce, is slated to succeed his chief, William P. MacCracken, Jr., as Assistant Secretary of Commerce for aviation. Mr. MacCracken has asked to be relieved of his present duties and it is understood that Major Young will take his place on the latter's return from tour of foreign air centers.

Aeromarine Gets No. 121

KEYPORT, N. Y.—Inglis M. Uppercu, president of the Aeromarine Klemm Corp., announces that the firm's monoplane has been awarded approved type certificate No. 121.

Eastman Preparing A Sesqui-Wing Boat

DETROIT, MICH.—The Eastman Aircraft Corp., recently incorporated here for $150,000 for production of a three place sesqui plane open cockpit flying boat, at this writing is putting the finishing touches upon its initial product, which will be exhibited in the second All-American Aircraft Show.

The boat, to be known as the "Sea Rover," will be powered by a Challenger engine. In some respects it resembles the lower powered flying boat displayed by Mr. Eastman in the Show last year. In the present plane, however, the Eastman company has done away with the outrigger type of tail surfaces, utilized the sesqui plane principle, and considerably improved the workmanship as compared with the first boat.

The "Sea Rover" was designed by James H. Eastman primarily as a sport model flying boat. For the time being, a production of two craft each month is contemplated, although it was said this will be increased later. The plane has a duralumin hull, an overall length of 26 ft., and an upper wing span of 36 ft. The chord is 5 ft. 8 in. and height, 7 ft. 8 in.

Aero Chamber Show Directorate Appointed

NEW YORK, N. Y.—In the recent first annual meeting of the Aeronautical Expositions Corp. the subsidiary of the Aeronautical Chamber of Commerce which handles the official aircraft shows for the industry, 15 directors were elected to the board. The Governors' meeting was adjourned until May 19, when the offices of president, vice president, secretary, and treasurer will be filled.

Directors elected are: Paul Henderson, T. A. T.; S. M. Fairchild, Fairchild Aviation Corp.; Harris M. Hanshue, Western Air Express; R. O. Mongan, S. K. F. Industries; C. H. Colvin, Pioneer Instrument Co.; H. F. Pitcairn, Pitcairn Aviation, Inc.; S. S. Bradley, Aeronautical Chamber of Commerce; Inglis M. Uppercu, Aeromarine Klemm Corp.; E. N. Gott, Keystone Aircraft Corp.; Charles L. Lawrance, Wright Aeronautical Corp.; Jerome C. Hunsaker, Goodyear-Zeppelin Corp.; F. B. Rentschler, Pratt & Whitney Aircraft Co.; C. J. Brukner, Advance Aircraft Co.; F. H. Russell, Curtiss Aeroplane & Motor Co.; and Walter Beech, Travel Air Manufacturing Co.

Dawn-Dusk Flights Fail

BROWNSVILLE, TEX. — Capt. Ira C. Eaker of the Army Air Corps failed in his second attempt to span the distance between this city and France Field, Panama, between dawn and darkness when he was halted at Tampico about 6.30 P. M. Monday night, March 18. But 200 mi. separated the airman from his goal when the attempt was abandoned. He had taken off from France Field at 4 A. M. the same day. On the flight south Captain Eaker took off from here early Saturday morning and arrived at France Field Sunday.

Universal Fleet of 30 Will Cost $2,500,000

CHICAGO, ILL.—A fleet of 30 tri-engined air liners costing more than $2,500,000 and ranging in carrying capacity from 12 passengers, two pilots and ample baggage, to 32 passengers and two pilots, will be in operation over lines of the Universal Aviation Corporation as soon as delivery on the planes can be obtained, it was announced tonight at executive headquarters here.

Six tri-engined craft are now in operation, nine more are in the process of delivery, and contracts are being signed for the remainder of the fleet of 30.

Universal now is operating two F-10 tri-engined Fokkers and four tri-engined Fords of the same capacity, some equipped as diners. Contracts were signed recently for five more of this type of Fokker, and contracts were drawn up with Fokker representatives for five big airplanes of 32 passengers capacity. These planes are the latest type in air liners and, like all of the tri-engined equipment ordered, will include every modern convenience, from lavatories to ash trays, free cigarets, easy chairs, beautiful interior decorations, etc. Contracts for these planes will be signed as quickly as certain technical differences concerning equipment can be straightened out, it was announced. These craft can be converted into pullman or day parlor car type. They are known as the DT-32 type.

In addition, negotiations are being conducted and contracts are expected to be signed soon for five additional Fords.

Mrs. Thaden Pilots Plane to New Mark

OAKLAND, CALIF.—Mrs. Louise McPhetridge Thaden took off from the municipal airport here at 3.51.35 P.M., Saturday, and landed at 1.54.57 P.M. Sunday, 22 hr. 3 min. 12 sec. later, setting a new sustained flight record for women. The previous record was that of Miss Bobbie Trout of Los Angeles, who recently established a mark of 17 hr. 5 min. and 37 sec.

Mrs. Thaden flew a Travel Air powered with the same Hisso engine she used to set the women's altitude record. The engine was reported in excellent condition when she landed. The plane carried 196 gal. of gasoline and 14 gal. of oil. All the gasoline with the exception of 18 gal. in the wing tanks were pumped with a wobble pump.

Two barographs were carried and timing was done by officials of the local chapter of the N.A.A. At one time 14 planes were in the air carrying sightseers anxious to watch Mrs. Thaden's effort from close range.

Irving Claims Record

OAKLAND, CALIF.—Maj. Livingston G. Irving of this port now lays claim to the light plane cross-country speed record. He reports flying from Oakland to Los Angeles in 2 hr. 25 min. in a Hisso powered Eaglerock. The distance is put at 365 mi.

Navy Air Head

David S. Ingalls of Cleveland, O., has assumed his duties as successor to Edward P. Warner.

Bellanca to Announce New 14 Place Aircraft

NEW CASTLE, DEL.—Details of a new 14 place plane are shortly to be announced by G. M. Bellanca of the Bellanca Aircraft Corp. here, according to reports. It is stated that the new craft will offer a great pay load capacity and will be capable of record sustained flight without refueling.

The plane is to be built in two types, differing only in power equipment. One will use a single Wright Cyclone engine, while the other will employ three Whirlwind J-6 engines of 300 hp. each. The design is based on that of the sesquiplane Roma, which has a span of 65 ft. and a fuel capacity of 1,100 gal.

Preparations are under way for doubling plant facilities for the production of the new craft as well as in response to the demand for the Standard CH model.

Moffett Reappointed

WASHINGTON, D. C.—As indicated in AVIATION last week, Rear Adm. William A. Moffett will be retained as Chief of the Naval Bureau of Aeronautics. The Rear Admiral has already served two terms in this position, having been first appointed in 1921 and again in 1925. He assisted in forming the Bureau and directed many expansions in naval aeronautics.

Schedule S. A. E. Meetings

NEW YORK, N Y.—Aeronautics meetings of the Society of Automotive Engineers are announced as follows: Detroit Aeronautic Meeting, April 9-10, Book-Cadillac Hotel; Western Aeronautic Meeting, June of July, during Wichita Show; Cleveland Aeronautic Meeting, August 26-28, during National Air Races.

Martin Purchases Huge Plant Site

Construction to Start at Once on 1200 Acre Tract at Baltimore

BALTIMORE, MD.—Purchase by the Glenn L. Martin Co. of a 1,200 acre tract at Middle River for an airport and airplane manufacturing plant has been announced by Glenn L. Martin, president of the company. It will be developed immediately into one of the largest landing areas for both land and water aircraft now in existence. The land contains a little less than 2 sq. mi. It has three miles of water front and one and a one-half mile frontage on the Pennsylvania Railroad tracks and is 10 miles from the City Hall.

Work will be started once on the first unit of the plant, which will include one-third of the main factory building. The first unit will be 1,083 ft. long and 900 ft. wide with 300,000 sq. ft. of floor space. There will be 18 ft. of clearance between floor and roof and the supporting pillars will be 100 ft. apart. The assembly hall will measure 300 by 125 ft. and the clearance will be 28 ft. inclusive of the factory building the initial investment will be $2,500,000.

Has Large Navy Contract

By July 7, about 500 workmen will be employed. Within a year, It is expected that the number will be increased to 2,500. When the whole plant is completed, at the end of three years, the company plans to have 10,000 men employed. The company moved here from Cleveland the first of the year. It now employs 250 in its temporary factory in a warehouse where it is manufacturing tools for the new plant. The company recently completed orders for 303 Navy bombing and torpedo planes for the contract price of $8,500,000.

"We have set aside 200 acres for our plant and about 1,000 acres for a flying field," Mr. Martin stated. "There will be room later for one or two other plants of kindred industries. Our plans also include a complete plant for making aircraft engines. By September 1, also, we shall have finished our first and temporary landing field, for both land and amphibian planes, which will cover some 300 acres.

Full Facilities Planned

"We shall build hangars for 160 planes, half of them at the water's edge for the use of large flying boats. There will be radio and telegraph stations, a restaurant and sleeping quarters and also gas, oil, and machine shops for repairs. Applications for use of the field already are in hand. It is located on the airway down the coast as laid out by the Aeronautics Branch. We shall have three runways, measuring 5,800 6,000 and 6,700 ft."

The company plans to build commercial as well as military machines but will concentrate on the latter for the present.

Term Pittsburgh Show a Success

Display 23 Planes and Five Gliders; $200,000 in Sales; 75,000 Attend

PITTSBURGH, PA.—Pittsburgh's first aircraft show closed here Saturday night successful from the three standpoints by which an affair of this nature is judged, attendance, exhibitors and sponsors.

Twenty-three planes and five gliders were on the floor of Motor Square Garden, the largest glider exhibit ever presented in the United States. Fully 75,000 visitors attended, and planes valued at approximately $200,000 were reported sold.

The largest volume of business was done by William S. "Billy" Brock, of the Schlee-Brock Aircraft Corp., Detroit, who sold seven Lockheed Vegas. Five of them went to the American Aircraft Corp., headed by F. E. McGillick, and Edward Ball, who will start one, to be delivered by April 1, on a new air line from Pittsburgh to St. Louis. Scheduled trips will be made weekly at first. The local company took one Wasp powered plane and two each powered with J-5 and J-6 Wrights.

Another Lockheed went to a Columbus firm and the seventh to a Memphis man.

Ford Transport Sold

A tri-engined Ford, powered with J-6's, the first job of its kind to leave Detroit, arrived just before the show closed. It was sold to Pennsylvania Airlines, Inc., Pittsburgh, by local Ford dealers, for a price said to be $57,000. A Stinson-Detroiter and a Stinson-Junior were bought by Col. Harry C. Fry, Jr., and his associates who took over the local agency. Lieut. William J. Austin, of Pittsburgh Aviation Industries Corp., sold a Husky Junior to Brilliant Airways, Pittsburgh, and a Davis monoplane, formerly the American Moth, went to an Ellwood City man through "Ted" Taney and Robert E. Dake, connected with Pittsburgh Airlines, Inc., distributors. A Challenger was sold to a Morgantown, W. Va., man. Other sales reported were a Waco "10" and an Eaglerock by the Morris Flying Service, Pittsburgh.

Many services booked cross-country flights, and nearly 100 students were booked by local flying schools.

Operators Organize

The Pennsylvania Aircraft Operators' Association formed the second organization of its kind in the United States. Clifford Ball, William J. Austin, and Robert E. Dake, all of Pittsburgh; W. S. Green, Philadelphia; A. K. Owens, Reading; Robert Hewett, Philadelphia, and J. P. Jones, Lancaster, were appointed to a committee which will call on Governor Fisher at Harrisburg, to encourage him to name on the new state aeronautical commission, men who are familiar with aviation. An attempt also will be made to have the state and Federal aviation laws coincide.

The Pittsburgh Flight of the Eastern Gliders Association was formed. Many leaders in the aviation industry attended the official aircraft show dinner and the seventh annual ball of the Aero Club of Pittsburgh, both held in the William Penn Hotel. William S. Brock officially lighted a powerful aerial beacon on Pittsburgh's tallest structure, the Grant building. The beacon, of neon tube construction, is 479 ft. above the street and 1,249 ft. above sea level. It is said to contain 64 more feet of light tubes than the beacons at Paris, Berlin and London.

Action Against Designer Fails

TAMPA, FLA.—Alfred Corte, airplane designer and mechanic, accused by Capt. A. B. McMullen, head of the McMullen Aircraft Corp., of taking designs and plans used in the construction of a plane built in his factory last fall, has been discharged by County Judge Cornelius. The court held that Corte had no criminal intent in taking possession of the plans.

Corte was employed by McMullen to assist in designing and building a monoplane. A lien has been placed on the plane, and McMullen has been restrained from removing the plane or flying it until the ownership of the designs and plans is determined.

Photo Firm Re-Organized

PORTLAND, ORE.—Retirement of W. E. Furnish from active participation in Continental Airways, Portland aerial mapping concern, and transfer of most of his interest in the company to seven men has been announced by T. V. Arnreiter, now general manager. Fred Vincent, advertising man, who, with Mr. Furnish, controlled the company, has retained his large interest. Besides Mr. Arnreiter and Mr. Vincent the company is now made up of Capt. Frank O. Mercer, former Army photographer and now in charge of the mapping work; Lieut. Gordon E. Mounce, pilot; C. E. DeBusse, Dr. W. A. Allen, Reid W. Allen and W. C. Saunders, according to the announcements.

Name Moth Distributors

LOWELL, MASS.—Appointment of two new distributors, the Thompson Aeronautical Corp. of Cleveland, which will handle the states of Ohio and Michigan, and C. B. Biggins of Harrisburg, Pa., who will handle central Pennsylvania, is announced by the Moth Aircraft Corp. here. These two distributors placed initial orders totalling 25 Moth planes. Other Moth distributors previously appointed are Earl L. House, Metropolitan New York and Northern New Jersey; Albany Air Service, Northeastern New York; and Skyways, Inc., New England.

Direction of Southern Air Transport Named

FT. WORTH, TEX.—The complete directorate for Southern Air Transport, Inc., which was recently effected by merging Texas Air Transport, Inc., and the Gulf Airlines, has been selected by A. P. Barrett, president of the Texas concern, and also of S.A.T.

James C. Willson, New York, heads the board of 20 men as chairman. Mr. Willson is president of the National Aviation Corp., and a director in the T.A.T., the Curtiss Flying Service, Inc., and the Curtiss Airplane Export Corp.

Other directors are: James P. Butler, New Orleans, president of the Canal Bank and Trust Co.; Frank B. Black, Chicago, attorney; Walter H. Beech, Wichita, Kan., president of the Travel Air Manufacturing Co.; J. Cheever Cowdin, New York, vice president of Blair and Co. and a director in T.A.T.; Clark Howell, Jr., Atlanta, publisher; Paul H. Henderson, Chicago, vice president and general manager of N.A.T. and vice president of T.A.T.; Charles S. "Casey" Jones, vice president of the Curtiss Airplane & Motor Co., Inc., and president of the Curtiss Flying Service; Z. D. Bonner, San Antonio, vice president of the Commercial National Bank; W. T. Carter, Jr., Houston, capitalist; C. E. Gillham, Ft. Worth, president of the American Bank and Trust Co. of Ft. Worth; Tom Hardin, Ft. Worth, vice president and general manager of Texas Air Transport; T. K. Jackson, Mobile, director in the Alabama Power Co. and Alabama Dry Docks and Shipbuilding Co.; J. Robert Neal, Houston, vice president of the Second National Bank of Houston; E. P. Smith, Chicago, capitalist; C. R. Smith, Ft. Worth, treasurer of Texas Air Transport; S. W. Souers, New Orleans, director in Second National Investors' Corp., executive vice president of the Canal Bank and Trust Co. and a director of Gulf Airlines and the North American Aviation Corp.; C. O. Yoakum, Birmingham, president of General Securities Corp.; and Frank M. Kemp, Dallas, general counsel for the Central and Southwest Utilities Co.

Gets Eaglerock Franchise

COLORADO SPRINGS, COLO.—Shreveport Airways, Inc., has been granted an Eaglerock sales franchise for the state of Louisiana, according to President J. Don Alexander of the Alexander Aircraft Co. The new distributor has airport facilities and financial backing which, it is said, will make it one of the largest aircraft sales organizations in the South. Heading the company is E. B. Redline, vice president of the Henderson Iron Works and Supply Co., Shreveport, large southern industrial group. The company has bought a Hisso powered Eaglerock demonstrator, will buy a Whirlwind plane shortly, and will take delivery soon on an OX Eaglerock for student training. A dealer established at Natchitoches, La., will take delivery on a Hisso powered Eaglerock April 1.

Wallace in Change

ROCKFORD, ILL.—Re-organization of the Wallace Aircraft Co. of Chicago, manufacturer of the Touroplane, will precede plans for transfer of the factory to this city, it is announced by Charles Thompson, president. Other business enterprises in which the Wallace company is involved will have broad bearing upon future development of the plant, the officials stated. Meanwhile the company is considering possibility of locating a branch factory in Toronto, Canada. J. J. Lake, sales manager, accompanied President Thompson on a recent visit and conference with local groups interested in the Wallace firm project.

Butler Firm Develops "Black Hawk" Biplane

KANSAS CITY, MO.—The Butler Aviation Corp. here has now developed a new airplane known as the "Black Hawk." The firm, which is a subsidiary of the Butler Manufacturing Co., built its first plane a few months ago. Tests proved it to be successful, but certain changes were decided on with the Black Hawk the result. The new machine is a biplane, designed for use either in mail or passenger service. It is powered with a Whirlwind engine. Waverley Stearman, the company's engineer, designed the plane.

The Butler Aircraft Corp. has elected officers as follows: E. E. Norquist, president; W. A. Knapp, vice president; Roy S. Kamp, vice president; F. A. Rufi, secretary; and Oscar D. Nelson, treasurer. Wilton M. Briney, until recently an officer in the Army Air Corps, being attached to the bombing squadron, has been appointed sales manager of the company. Before entering the Army corps two or three years ago Mr. Briney was engaged in newspaper advertising work.

Billings Air Transport Buys Partington Firm

BILLINGS, MONT.—Purchase of the Partington's Skyways was announced here recently by Billings Air Transport, Inc., a firm organized here a year ago by R. G. Woodward. The latter states that he has secured Lieut. V. R. Lucas, well-known Montana pilot, to superintend student instruction activities in the company's flying schools.

Three schools are now being operated by the firm at Billings, Glendive and Terry, respectively. Three more are to be opened shortly. Four planes, a Ryan Brougham for cross-country and scenic trips, and three training planes are in service at the Billings airport. Two Barling NB-3's, for which the firm is Northwest distributor, have been ordered.

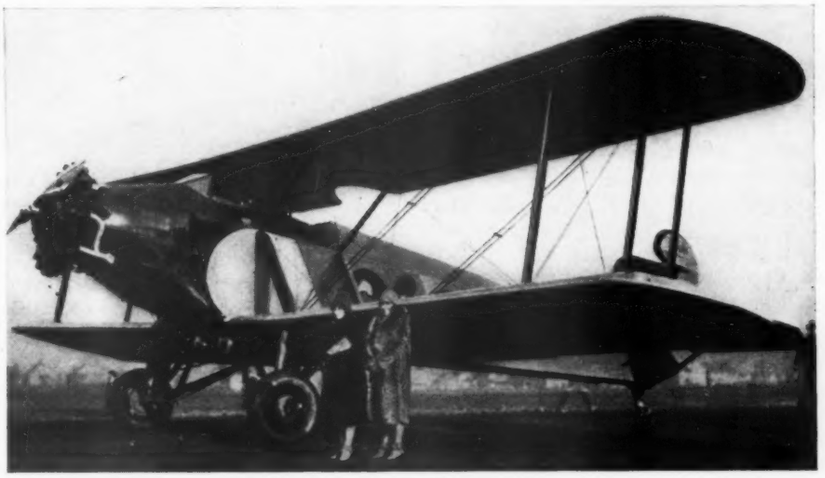
Hoffman Wins Damages

SUPERIOR, WIS.—L. A. Hoffman, president of the Head of the Lakes Airways, Inc., of this city, was awarded $2,500 damages, the amount for which one of his planes destroyed by fire in August, 1928, was insured. The policy specified that the loss by fire would be covered under all circumstances, but the insurance company argued that the carrying of passengers by a student pilot contrary to the Department of Commerce regulations did not entitle the plaintiff to any claim for damages.

Five More Challengers Sold

HAGERSTOWN, MD.—Announcement is made by Kreider-Reissner Aircraft, Inc., that three of the firm's OX-5 C-2 Challenger biplanes have been sold to Skyways of Michigan. Two, furthermore, have been called for by Starlighters, Inc.

New Great Lakes Plane



CLEVELAND, O.—"Miss Great Lakes," the first commercial plane to be produced by the Great Lakes Aircraft Corp. of this city was recently test flown successfully. Powered with a Hornet engine, the craft is credited with a top speed of 125 m.p.h. and a cruising speed of 110 m.p.h. The machine, substantially the same in construction as the Martin 74, is a six place craft, a cabin having been built into the fuselage.

"Miss Great Lakes weighs 3,500 lb. empty, has a span of 53 ft., an over-all length of 35 ft. and is of duralumin with fabric covering. Charles W. Meyers, sales engineer and test pilot of the company, tested the plane in the presence of Col. Benjamin F. Castle, newly-elected president of Great Lakes Aircraft, William R. Wilson, chairman of the board, and a group of Cleveland city officials, businessmen and other flying enthusiasts.

In a brief speech during the christening ceremonies, Colonel Castle said that the machine signalized the entrance of the corporation into the commercial aircraft field. Heretofore the plant had been devoted exclusively to the production of the Martin bombing planes. A complete line, ranging from light training planes to huge air liners, will be manufactured.

Buys Ken-Royce Plant Site

KANSAS CITY, KAN.—The Rearwin Ken-Royce biplane is to be manufactured in this city at a plant to be erected on a two and one-half acre tract of land bordering the Fairfax Airport, south of the factory of the American Eagle Aircraft Corp. The initial investment on the new site will be about $200,000. A brick factory building, 100 x 300 ft., will house a sales room, offices and machine shops. Architects have started designs of the buildings and construction will start as soon as weather permits. Mr. Rearwin hopes that construction of aircraft will be started by the middle of May.

P. & W. Order for Mexico

HARTFORD, CONN. — Twenty-one Wasp and Hornet engines are being delivered by the Pratt & Whitney Aircraft Co. to power new bombing and fighting planes which the Mexican government has ordered for the Federalists forces. A rush order was received last week by the company from the Vought interests in New York and the Douglas Company of Santa Monica, Calif.

Aero Exhibit at Hartford

HARTFORD, CONN. — Aeronautics will be represented at the Home Progress Exposition to be held here April 6. All the local companies have signified their intention of having displays at the show.

New Miami Amphibian Shortly Will Be Tested

HIALEAH, FLA.—The first test airplane of the Miami Aircraft Co., a corporation headed by Joseph M. Smoot, is now almost complete at the temporary factory in Hialeah. Construction of the hull is under the supervision of A. Anderson, designing engineer of Indianapolis, with Frank Somers as chief engineer in charge of the building.

The craft is an amphibian monoplane, one of the first of this type to be made in the United States. It will have a wing spread of 44 ft. A Menasco-Salmson engine has been chosen for power.

The amphibian wil be tested out soon and will be launched from the water. There is seating space for five persons including the pilot, and dual control is provided. Plans for a large production factory are well under way.

Addition for National Firm

CLEVELAND, O.—National Bronze and Aluminum Foundry Co., this city, have broken ground for a large addition to its plant which will increase the present capacity by 50 per cent. The new facilities are needed to meet the demand for Tenual, the aluminum quite free from oxides that has been developed by the National firm following special research.

TACOMA PUBLIC LIBRARY

Clark Plane Had Low Drag Cowl

Retractable Landing Gear Also Employed on "Alerte"

NEW YORK, N. Y.—For those who claim that there is nothing new under the sun it is interesting to note that in 1921 Col. V. E. Clark designed an airplane having a cowling bearing some resemblance to the recently developed low drag types for static radial air cooled engines. The plane was also equipped with an undercarriage which was retractable in flight. It was a braced monoplane intended for use in the defense of military bases against approaching enemy aircraft and was afterwards known as the Dayton-Wright "Alerte."

The Alerte was powered with one of the first Wright J-1 175 hp. engines and, with full military load including 50 calibre machine guns, ammunition and equipment, attained a speed of 138 m.p.h. at an altitude of 15,000 ft. without any means of supercharging the engine.

Air Flow Control

The cowling of the Alerte was designed to take in air from the front and, through the action of a form of annular venturi, increase the velocity of flow past the hottest cylinder fins, reducing the velocity where cooling was not needed. The air was then sucked out of a complete circumferential louver located at such a distance behind the cowling that the air pressure is below normal, after which the air flow is somewhat smoothed out so that it clings to the sides of the fuselage in the rear of the cowling.

Visibility between cylinders, which is sacrificed in this type of cowling, was partly restored in the case of the Alerte installation by depressions in the form of the cowling between the upper cylinders. This feature, however, would tend to nullify a portion of the gain in performance derived from the use of complete cowling according to recent research conducted in the 20 ft. propeller research tunnel at Langley Field by the National Advisory Committee for Aeronautics.

Patrician Reaches West Coast

LOS ANGELES, CALIF.—The Keystone Patrician, largest American passenger plane, completed its transcontinental flight when it landed at the Grand Central Air Terminal, Glendale, March 12. The plane was piloted by Capt. St. Clair Streett and is in charge of Kenneth G. Fraser of the Keystone concern. More than 600 passengers are reported to have been flown in the Patrician during its leisurely tour across the continent. The Patrician is to continue the Pacific Coast tour from this city to San Francisco, Oakland, Portland and Seattle. The return flight is being planned by way of Los Angeles and the southern route to Wichita, Kan., and points eastward.

Showing the cowling designed by Colonel Clark in 1921 installed on the "Alerte" monoplane.

"Stanolind" is Sold

KANSAS CITY, MO.—"Stanolind," the tri-engined Ford plane long operated by the Standard Oil Co., of Indiana, from which it derives its name, has been sold by that company to Mr. and Mrs. Dale Seitz of this city. The craft is to be operated in passenger service off Fairfax Airport owned by the Woods Brothers Corp. Mrs. Seitz, neé Ruth Haviland, is official hostess at the field, so appointed by the Woods concern.

Chicago Group Gives Rates For Exhibition

CHICAGO, ILL.—Applications for space at the Chicago International Aircraft Exhibit to be staged September 7-15 under the auspices of the United Aeronautical Society of this city, have been distributed to the industry. For each airplane shown there will be a minimum charge of $200 and there will be a charge of $10 for each foot of wing spread over 35 ft.

Booths on either the floor or the balcony of the Coliseum, where the display will be held, will range in price from $140 to $800. There will be a special section devoted to engine exhibits. Incomplete aircraft will be classified as parts and will be included in the regular accessory exhibits.

Lockheed Orders Reported

LOS ANGELES, CALIF.—The Lockheed Aircraft Co. reports that orders for a total of approximately $250,000 worth of planes were received by that company during the first two weeks of March, outside of the regular contracts held by distributors of Lockheed aircraft. Among these orders, it was said, was an order for a second plane for the Texas Oil Co. There were also several individual orders, and one order from the Aviation Schools, Inc., of Seattle, was said to call for six Wasp powered Lockheed planes.

Consolidated Orders Placed

NEW YORK, N. Y.—An order for complete ignition switch equipment for 1,000 Travel Air planes, manufactured by the Travel Air Aircraft Co., Wichita, has been received by the Consolidated Instrument Company of America, Inc., according to announcement, today, by J. Leopold, president. Tachometer equipment for 300 Swallow planes of the Swallow Airplane Co., Wichita, also has been ordered from the Consolidated company, Mr. Leopold reports.

Travel Air to Show Two New Airplanes

WICHITA, KAN.—Two new models have been announced by the Travel Air Manufacturing Co. One of these is a four place cabin monoplane powered with either the 170 hp. Curtiss Challenger or the Wright "New Whirlwind Seven" engine and the other a three place open cockpit biplane powered with a 150 hp. Axleson engine.

The monoplane resembles the Model 6000 and has a wing span of 43 ft. 6 in., an overall length of 27 ft. 6 in., and an overall height of 8 ft. 8 in. While performance figures are not yet available it is expected that a cruising speed of 100 m.p.h. will be attained. The plane will be exhibited for the first time at the Detroit Aircraft Show.

The biplane, which is designed for light commercial, sport and training purposes, also will be exhibited at the show. This craft will be known as the A-4000.

Boeing in Expansion

SEATTLE, WASH.—A general plant expansion program, aggregating more than $200,000, has been undertaken by the Boeing Airplane Co. here, according to announcement by W. E. Boeing, chairman of the board, and P. G. Johnson, president. The program includes an office building housing the engineering offices, a time office building and a master sewer system for the general plant. The architect and builder is The Austin Company of Cleveland, which also will install the heating, lighting and plumbing, according to announcements.

Corrects News Story Statement

NEW YORK, N. Y.—A statement has been issued by A. R. Martine, now organizing the Blackburn Aircraft Corporation of America, that Lady Mary Heath had no part in the placing of his order for six Blackburn "Bluebird" planes with the English company, as was reported in a recent release. Lady Heath has no connection with the Blackburn Aircraft Corporation of America nor does she represent the Blackburn firm in America, Mr. Martine further avers.

Fairchild Announces Plane Export Orders

FARMINGDALE, L. I., N. Y.—Airplane orders for export valued at $314,000 were received during January and February of this year by the Fairchild Airplane Manufacturing Co., it is announced.

Figures made public at the Fairchild plant by G. B. Grosvenor, president, indicated that last year's American export sales, 170 planes, totalled $1,825,637. Of the 18 Fairchild foreign orders thus far placed in 1929, 13 planes costing $223,000 have already been delivered.

These orders, all for high-wing cabin monoplanes, came from Canada, Mexico and Central and South America. Four were for the Whirlwind powered Fairchild 1928 model FC-2, four for the Wasp powered 1928 model FC-2W2, and 10 for the seven passenger Wasp engined model 71, largest of the Fairchild 1929 line.

The purchases were distributed to the following countries: Canada, 8; Mexico, 4; Chile, 3; Peru, 2; and one to Central America.

Building New Light Plane

CLEVELAND, O.—A new training and sport plane is being built here by the Great Lakes Aircraft Corp. The machine was designed by Capt. Holden C. Richardson, P. B. Rogers and Charles W. Meyers to sell at a comparatively low price. The first product will be on exhibition at Detroit, it is expected.

The plane has two open cockpits, will be powered with the Cirrus engine and is said to be highly streamlined. The fuselage is of welded steel and the wings are of duralumin and spruce with fabric covering. It will have dual controls.

Gets Bird Distributorship

NEW BEDFORD, MASS.—Distributorship in Massachusetts and Rhode Island for the Brunner-Winkle "Bird" biplane has been taken by the Southern New England Aircraft Co. here. The firm is now appointing dealers in these states, having divided Massachusetts into five districts with Rhode Island as one.

Rupprecht Organizing Service

PATERSON, N. J.—Charles F. Rupprecht, M. E., announces here that he has severed his connection as factory manager with the New Standard Aircraft Corp., this city, to organize a professional service for aircraft manufacturers covering plant design and construction, manufacturing process layouts for production purposes, organization and installation of practical cost and plant operating systems, etc.

Kreider-Reissner Expanding

HAGERSTOWN, MD.—Kreider-Reissner Aircraft, Inc., is expanding to care for increasing business, with work starting at once on a modern fireproofed structure, 120 by 320 ft., and a two-story office building. Several new model planes are to be offered this summer.

Eagle Distributors Named

KANSAS CITY, MO.—The Monessen Aero Corp. of Monessen, Pa., has been appointed distributor in the Western section of that state for the American Eagle Aircraft Corp. of this city. The company has signed an order for 25 Eagle airplanes for the 1929 season. C. N. John and R. F. Schoaf are the directing heads of the company. Contracts, furthermore, have been signed with officials of the Romkey Flying Service whereby that company will serve as distributor in Peoria, Ill., and Burlington, Ia., operating on 10 plane contracts in both cities. The territory of the company will be Central Illinois and Southeastern Iowa. Dr. John R. Reardon is head of the firm.

New Firms Announced

BRILLIANT SCHOOL OF AERONAUTICS, capital $150,000. E. L. Bartley, B. A. Bartley, Howard Johnson, H. R. Bazley, Frank Stevens, Edgar Reed, Pittsburgh, Pa.

COMMAND-AIRE SALES CO., capital, $25,000.. Harry M. Crowe, W. E. Brown, John T. Gibson, Tulsa, Okla.

FLUSHING NEW YORK AIRPORT, INC., capital 100 shares no par value stock. L. Hyler Connell, Sadie W. Newland, Agnes C. Bokstrom, New York City.

ROOSEVELT FIELD, INC., capital $1,000,000. Harold G. Hathaway, William Rand, Jr., Stanley W. Ayres, North Hempstead, L. I.

TRI-STATES AIRWAYS CO., INC., capital 250 shares preferred stock at $100 and 2,000 shares no par value common. H. Clay MacBrair, Norman S. Smith, George R. Blanchard, Middletown, N. Y.

INSTITUTION OF AERONAUTICS, INC., capital $100,000. George Rockwell, Jr., Donald V. Lowe, John H. Leddy, to manufacture aircraft, New York City.

ST. LOUIS AERONAUTICAL ASSOCIATION, capital $10,000. J. T. Herzog, Clarence Brown, and Theodore Lorenz, to devote present time to giving instruction, temporary headquarters at 3518 Paris Avenue, St. Louis.

UNION TERMINAL CORP., capital $100,000, to provide terminal buildings, Richmond, Va.

WINGS, INC., F. T. Whited, 349 Lister Street, Shreveport, La., to operate airplane mechanics' school.

KREUGER AIRLINES, INC., capital $1,000,000. A. P. Kreuger, Hugh L. Willoughby, to offer taxi service and conduct flying school, Fort Pierce, Fla.

PACIFIC COAST AIRWAYS, INC., capital $40,000. Richard J. G. Bomar, Ray Hunt, Seattle, Wash.

WESTERN AERO, INC., capital $30,000. H. L. Stark, A. H. Zieglitz, J. A. Kinnear, Seattle, Wash.

NORTH CAROLINA AIR TRANSPORT CO., Capt. R. H. Folk, Lieut. A. J. Smith, to establish training school, Charlotte, N. C.

EQUITABLE AIRCRAFT SALES CORP., capital $100,000. R. D. Gerstenlauer, C. F. Farbach, and Lawrence Morris, New York City.

THE WATKINS AIRCRAFT CO. has been incorporated in El Paso, Tex., with a capital of $10,000 by Sam Watkins, 1420 Hawthorne Street, and others.

Pacific Zeppelin Line Considered

LOS ANGELES, CALIF.—Regular trans-Pacific flights are planned by the Goodyear-Zeppelin Corporation, according to a statement recently made in Los Angeles by President P. M. Litchfield. These dirigibles are expected to be in service by 1932, it was said, and would maintain regular passenger, mail and freight service between California and the Hawaiian and Philippine Islands.

A preliminary survey of Pacific Coast air conditions is to be made by a four place baby blimp, 130 ft. long and carrying two engines, which is now being assembled, it was stated.

The large dirigibles to be placed in service will be of the same general construction as those for which the Navy has contracted.

Taylor Aircraft Moves

BRADFORD, PA.—The Taylor Aircraft Corp., formerly of Rochester, N. Y., has acquired a tract of land adjacent to the municipal airport here, on which it plans to start immediately the construction of a modern airplane manufacturing plant, it was stated this week by L. S. Bannister, business manager of the company. General offices have been moved from Rochester to Bradford.

Orders 12 Kari-Keens

SIOUX CITY, IA.—The R. O. Lewis Aircraft Co. of Los Angeles has contracted for immediate delivery of 12 Kari-Keen airplanes for distribution in its territory, Arnie Stensrud, manager of Kari-Keen Aircraft, Inc., announces. R. O. Lewis, president, and C. H. Chidlow, pilot, of the Los Angeles concern, have been here testing the planes and making arrangements for West Coast representation.

Money Sent by Plane

The Federal Reserve bank in New Orleans is probably the first banking institution in the South to use airplanes for the transfer of cash. The bank received an emergency request a few days ago from a financial institution several hundred miles from here. Train schedules were inconvenient. The money was sent in a plane of one of the local companies, accompanied by an armed guard.

Instruments for Ford

LONG ISLAND CITY, N. Y.—Contract for 100 oil temperature indicators from the airplane division of the Ford Motor Co. is announced by the Moto-Meter Company, this city.

Meet for Red Bank

RED BANK, N. J.—Plans to hold an air meet July 3-6 are announced by the Aero Club of Red Bank.

BRIEFLY—

Charles F. D. Evans, Moth Aircraft Corp. pilot at Lowell, Mass., claims a light plane altitude mark of 20,300 ft. made recently in a metal fuselage Gipsy Moth plane.

Moto-Meter Company ice warning indicators are to be standard equipment for the Stearman plane known as the Speed-Mail M-2.

Pilot training at the Ford Airport, Dearborn, Mich., includes a tour, sometimes six months in length, through the shops. Thus the pilot learns the construction of the planes.

Capt. Ernest L. Smith has been awarded the Distinguished Flying Cross for his flight from Oakland to Hawaii in July, 1927.

Eddie Stinson has completed more than 14,000 hr. of flying after 15 yr. aeronautical work, according to J. Earle Miller.

Five Oakland municipal airport pilots offered their services to the Mexican government in answer to a recent call issued by Gen. Arturo Torre, Mexican consul at Los Angeles.

A correction has been called to our attention. On page 728 of the March 9 issue of AVIATION, the name "Christman" in the 23rd line should have read "Christmas."

National Airways, Inc., will distribute New Standard planes in Virginia, it is announced. Delivery dates have been given on four Wright powered planes.

Free air trips to Minneapolis and return on Universal planes were given as prizes to winners in the recent Haven Model Airplane Club's endurance contest held at Evanston, Ill.

Curtiss Flying Service, Inc., has selected Denver, Colo., as its headquarters for the Rocky Mountain district.

The Republic of China is reported to be negotiating with the Stinson Aircraft Corp. for purchase of a number of monoplanes for use in that country.

Paul R. Braniff has announced a pay-as-you-learn plan for his aviation school at Oklahoma City. "We will give," he says, "a 10 hr. course for $25 upon enrollment and $25 per week for 10 weeks."

Dean Franz A. Kartak of the Marquette University College of Engineering, Milwaukee, Wis., announces aero engineering courses will be offered beginning this Fall.

The requests for weather reports, mostly from aviation interests, have caused the United States Weather Bureau in New York to fall three months behind in its annual report and other routine business. Foreseeing still further increase in weather requests with the growth of air transportation, the Bureau has asked for additional help.

Union Air Line on the Pacific Coast expects delivery about June 1 of three twin-engined Douglas flying boats which will be used to inaugurate the Seattle-Ketchikan-Juneau, Alaska, service.

It is reported that the Stearman Aircraft Co., of Wichita has started construction of a large multi-engined plane for use in the Varney service.

Pacific Air Transport, Inc., has received an extension of its license to use Crissy Field, Calif., to Jan. 1, 1930.

Wings Over New York, Inc., a new air sightseeing company has organized in New York to operate a service which includes transportation of passengers from city points to the new airport at 2:30 P.M. and 8 P.M. daily.

Kansas City is to be included in the passenger air service of the Central Air Line of Wichita, Kan. Omaha, Neb. may be included later.

James A. Talbot, president of the Richfield Oil Co., is taking delivery on a de luxe Fokker F-10 plane which is said to have been built at a cost of $150,000. Special decorations, equipment, and furnishings mark the new craft.

A report from Madison, Wis., states that Madison Air Transport expects to purchase a Keystone Patrician 20 passenger plane for delivery to a Northern Wisconsin industrial firm.

An increase of 215 per cent. in actual deliveries for January and February of this year over the same period in 1928, is reported by the Aircraft Control Corp. of Philadelphia, a subsidiary of the Consolidated Instrument Co.

Completion and assembling of the first flight of Vought fighting planes being built on a rush order for the Mexican government, is announced at Mitchel Field, L. I.

The Westchester-Biltmore Country Club has entered into a contract with Coastal Airways, Inc., New York City, for seaplane service for its members.

The Briles Flying Service has been incorporated in Leesburg, Fla., with a capital stock of $10,000. The board of directors include F. E. Briles, C. A. Briles and G. L. Briles.

The Boyer Air Service, Sikeston, Mo., has been formed with a capital of $5,000, to conduct an air service and school of aviation. The directors are W. A. Welch, H. Boyer and L. McMillan.

The Richmond Airway Corp. has been chartered in Richmond, Ind., by L. B. Lower and others, with a capital stock of $25,000. It will equip a flying field west of the city on the National Road, on what is claimed to be the highest spot between Dayton and St. Louis.

Trade Tips

It Has Been Reported That—

—Valley City Commercial Club, Valley City, N. D., plans promotion of a municipal airport.

—Bids on improvement work to be carried on at the new Government field south of Guthrie, Okla., are being received by M. M. North, assistant airway engineer of the Department of Commerce.

—A dormitory for six enlisted men is to be constructed at the Tucson, Ariz., airport and bids for the work are now being received.

—An aviation ball will be given by the Bloomington, Ill., Flying Club April 5 to finance the purchase of a new plane.

—Greenfield, Mass, has voted to establish an airport and has appropriated $40,000 for the purpose.

—The airport commission, Winston-Salem, N. C., is to let the contract for construction of a second hangar, 60 by 70 ft., at the Miller Municipal Airport.

—Carroll Airport, Inc., Carroll, Ia., of which S. D. Martin is secretary, will build a hangar on the 100 acre local field, which is to be open for traffic by September 1.

—U. S. Air Lines, Inc., of Cleveland, will erect a hangar at Columbus, O.

Q.A.N.T. Aerial Services of Australia reports the following record for a Bristol Jupiter engine installed in one of its machines. The engine was run for 297 hr. 10 min. in the air and 51 hr. 45 min. on the ground between March 20 and December 23 last year without being touched for repair except to replace five valve caps, one oil connecting nipple, one valve spring and one set of spark plugs.

Planes are reported to be playing an important part in meeting the transportation problems between the New Guinea coast and the inland gold fields. The planes cover the distance in an hour.

Of some 4,690 licensed fliers in the country, 34 are women. California has eight licensed women pilots. New York has seven. Two of these women have Transport licenses, while six have Limited Commercial licenses.

A business man's course in aeronautical theory will be established by the Western College of Aeronautics, Los Angeles, on April 2.

Three large airports are under construction in Mexico at Teziutlan, Puebla and Tlacotepec.

Personnel

PROF. C. H. CHATFIELD of Massachuetts Institute of Technology has been appointed a member of the Alexander Eaglerock Committee on Scholarship Awards.

LYMAN F. WOODRUFF has been appointed traffic manager for the district of Kentucky of the Continental Air Lines, Inc.

L. M. DIVINIA has been appointed assistant sales manager in charge of service and F. L. MILES has been placed in charge of field service for the Stearman Aircraft Co. of Wichita, Kan. J. E. SCHAEFER has been elected to the Stearman board of directors.

A. P. MCCULLOUGH has been appointed vice president and general manager of Aeronautical Schools Association of Wichita, Kan.

JACK I. BURSON has been appointed manager of the Radio Aircraft Corp. and the W-I-L Air School, Inc.

LIEUT. J. S. FISHER has been appointed chief ground school instructor of Parks Air College, Inc., of St. Louis. GEORGE B. MANNING has been appointed instructor in the ground school.

W. G. HERRON has resigned as vice president of Boeing Air Transport, Inc., to take effect early in April, to accept an important executive post with Air Investors, Inc., of New York City.

LIEUT. JOHN C. DEATOR has joined the piloting staff of Canadian Colonial Airways on the New York-Montreal air mail and passenger service.

ALGER GRAHAM has been selected by the Verville Aircraft Company to test the company's new product, the Verville "Air Coach."

LIEUT. W. S. SHANNON, former Marine Corps pilot, recently was appointed sales manager of the Curtiss Flying Service of Michigan.

LOUIS MEISTER, for the past several years connected with the Buhl Aircraft Co., resigned recently.

DANIEL M. SCHAEFFER, C. B. MOSELEY, E. L. LANDRETH and ARNOLD C. DICKENSON were added to the Board of Directors of the Curtiss Flying Service, Inc., at its annual meeting March 14. W. A. HARRIMAN resigned as a director.

H. J. GRAVES has been appointed by the Post Office Department as supervisor of the four air mail lines radiating from Atlanta, Ga.

J. L. HUBER, EDDIE PRESTON and F. H. GRIEME have been appointed to the piloting staff of the Thompson Aeronautical Corp.

ROBERT F. BURTT has resigned as director of the aviation bureau of the Kansas City Chamber of Commerce to become the Mid-West sales representative of the Curtiss Flying Service.

A. O. HUGHES has been appointed sales manager of the Porterfield Flying School, Kansas City.

C. F. DARNELL of Little Rock, and ROY SCHLEYMEIR of Oklahoma City, have been added to the piloting staff of the Braniff Air Lines, Oklahoma City.

HUBERT RUESCHENBERG has joined the staff of the Brownsville, Tex., flying school, and the Brownsville Municipal Airport.

G. M. GRAHAM has joined the sales force of the Minneapolis branch of Universal Aviation School. He formerly was assistant to the president of Harvey Hubbell & Associates in Minneapolis.

ROGER AMORY has been elected president of the Aviation Securities Corp. of New England. The other officers are LESTER WATSON, vice president; ROBERT D. RUGG, treasurer, and CHARLES W. HUBBARD, JR., secretary.

GEORGE HARDMAN of the Naval Aircraft Factory, Philadelphia, was scheduled to join the engineering staff on Monday, March 11.

JOHN L. CAMPION, formerly personal pilot for Fred Stone, noted musical comedy star, has been appointed factory representative of the Mahoney-Ryan Aircraft Corp. in the eastern territory. Mr. Campion will cover the eastern seaboard as far inland as Ohio and as far south as Florida. G. A. "BUDDY" JONES will cover the Central States, and TED SCHLUETER will be West Coast representative.

Reviews

Physics of the Air, by W. J. Humphreys, U. S. Weather Bureau, second edition. This book contains all the material of the first edition, which is now out of print, and an additional part, Meteorological Acoustics, has been included and many paragraphs and topics have been added. None of the material in the first edition has been discarded but various portions have been rewritten and rearranged.

The volume is divided into five parts under the titles, Mechanics and Thermodynamics of the Atmosphere, Atmospheric Electricity and Auroras, Meteorological Acoustics, Atmospheric Optics, and Factors of Climatic Control. Appendix I, Gradient Wind Velocity Tables, contains two tables. Appendix II provides a number of convenient constants and equivalents. The price of the book is $6.00.

* * *

Aircraft Float Design, by Capt. Holden C. Richardson, Bureau of Aeronautics, Navy Department. This volume has been prepared in response to a number of requests for information on the subject from students, engineers and designers. It is divided into 12 chapters and includes an appendix containing a glossary of special terms and abbreviations.

A number of shapes and combinations are reviewed in considerable detail and the records of several failures are included in cases where these considerations lead to better understanding of the subject. The subject of design is treated from the standpoint of proportion and form arrangement and carried into the determination of performance. Considerations affecting loading conditions are indicated and the usefulness and importance of model tests is emphasized.

Aeronautical Calendar

March 23-30	Aviation Show of the Buffalo Chamber of Commerce, Buffalo Armory, Buffalo, N. Y.
April 6-14	Second Annual All-American Aircraft Show of the Detroit Board of Commerce, Convention Hall, Detroit, Mich.
April 10	National Glider Conference, Statler Hotel, Detroit, Mich.
May 1-3	Joint meeting professional divisions, American Society Mechanical Engineers, Detroit, Mich.
May 4	National Elimination Balloon Race for the Litchfield Trophy, Pittsburgh, Pa.
May 7	International Aeronautic Conference and Exhibition, Seville, Spain.
May 14	Fourth Annual Aircraft Engineering Research Conference, Langley Field, Hampton, Va.
May 27-June 2	Indianapolis Aviation Show of the Indianapolis Aircraft Association, State Fair Grounds.
May 28-30	Gardner Annual Trophy Race, St. Louis, Mo.
June 27-30	International Light Plane Meet, Amsterdam, Holland.
July 16-17	International Aircraft Exhibition of the Society of British Aircraft Construction, Olympia, London.
Aug. 24-Sept. 2	National Air Races and Aeronautical Show, Cleveland, O.
Sept. 6-7	Schneider Cup Race, over the Solent, Cowes, England.
Sept. 7-15	International Aircraft Exhibit of 1929, Coliseum, Chicago, Ill.
Sept. 28	Gordon Bennett Balloon Trophy Race, St. Louis, Mo.
Oct. 12-27	Southwestern Aircraft Exposition, State Fair Grounds, Dallas, Tex.
Dec. 1-9	International Aeronautical Exposition of the Aeronautical Chamber of Commerce, Chicago.

AIRPORTS AND AIRLINES

Airport Projects Being Developed

Many Communities Launch Spring Improvement Programs

Many airport projects are being announced or being started with the advent of spring. Construction of the seaplane harbor for the naval militia near Detroit has been stimulated by the release of $21,000 for a building program. About $70,000 have been spent on the dredging and hangar. The new sum will provide for four more buildings.

Royal Palm Airways, Inc., Orlando, Fla., has announced the purchase of a site of about five acres facing the Orlando Municipal Airport. This land will be used as a southern base for the company. A hangar and other facilities for the accommodation of 150 students will be built. The concern has purchased a site in Plattsburg, N. Y., which will be its northern base.

A site including 143 acres located about 5½ mi. from St. Cloud, Minn., has been donated to that community by Mrs. A. W. Whitney in memory of her husband. The Atlantic Air Service of Newark, N. J., has leased for five years the Westfield Airport and work will start soon on three hangars. The Oakdale City Council, Oakdale, Calif., has authorized the purchase of 25 acres one mile south of the city which will be built into an airport immediately.

Start Waynoka Field

Construction has started on the T. A. T. airport at Waynoka, Okla. This is one of the transfer points of the company's transcontinental line at which passengers will change from planes to trains. Construction has started at the Tampa Municipal Airport on a new hangar 150 by 100 ft. It will be used by Pitcairn Aviation, Inc., and the McMullen Aircraft Co. as well as individuals.

Several Federal inspectors at Candler Field, Atlanta's municipal airport, have recommended that the field be enlarged to care for increasing traffic. The airport is the cross roads of air mail in the southeastern area. It was also recommended that one or two additional airports be provided. Improvements in the illuminating of Denver Airport are being carried out. Rotating cross lights, ceiling light and boundary light standards are being installed.

Plans have been completed at Atlantic City for a $150,000 municipal airport at Bader Field which will be finished in time to handle summer traffic. Development at the Boston airport at Boston is to include erection of an administration and control building, construction of which will be started as soon as a loan request now before the City council is passed. Commercial operators are now arranging for the erection of hangars.

Coachello and Indio, Calif., located east of Los Angeles, have combined in the development of an airport site midway between the two towns. Construction of the field is now under way. The Aerial Traction Co. of Danville, Ill., has leased 80 acres near this city for the development of an airport. Further improvement of the Grand Forks, N. D. municipal airport is planned for this summer.

Bonds in the sum of $25,000 for the purchase and improvement of an airport one mile north of Roseburg, Ore., were placed on sale March 18. The money will be used to buy 140 acres and for the improvement and lighting of the field. The drainage system and sodding the field will cost about $14,000.

Army to Build

Improvements costing about $800,000 will be made at Mitchel Field, Long Island, this summer. This development program includes two hangars costing $39,000, field shops costing $81,000, a field warehouse, headquarters and operation building, parachute, photographic and radio buildings. The Advance Aircraft Corp. has announced plans for an airport on the Sunrise Highway, L. I., 15 mi. from New York City, 8 mi. from Brooklyn.

Twenty acres have been added to Bowman Field, the Louisville, Ky., municipal airport, providing the addition of about 1,000 ft. to the runway. An administration building costing about $20,000 is to be erected soon, and the Standard Oil Co. will install a service station, paying a yearly rental of $60 and a cent a gallon tax on each gallon of gasoline sold, and five cents for each gallon of oil. The National Aviation School of Louisville, which recently announced the affiliation of the Curtiss Flying Service, will build a $40,000 hangar at the field.

Dedicate Chandler, Ariz., Port

CHANDLER, ARIZ.—Thirteen visiting planes participated in the dedication of Chandler's new municipal landing field recently, and Gov. John C. Phillips, Mayor F. J. Paddock of Phoenix, President P. J. Spilsbury of the Arizona Industrial Congress, Kirk T. Moore, chairman of Arizona's Aviation Committee, and Jack Frye also took part.

S. A. F. E. Postpones Opening

OKLAHOMA CITY, OKLA.—Due to delay in receipt of equipment, regular service over the St. Louis-Tulsa-Oklahoma City-Dallas airline of the Safe Airway Fast Express Co. again has been postponed. Earle P. Halliburton, president, has announced that the line will probably be begun April 1st.

T. A. T. Gets Permit For Radio Equipment

WASHINGTON, D. C.—Transcontimental Air Transport has provisionally been granted construction permits by the Federal Radio Commission for seven radio stations along its air-rail route for maintaining constant two-way communication with its planes. The company plans to establish and operate the stations with a view toward turning them over to the Airways Division of the Aeronautics Branch, when sufficient appropriations are made for Government operation of aeronautical radio.

E. W. Proctor, radio engineer for T. A. T., announced that he is making plans to erect the stations at Columbus, Indianapolis, Waynoka, Okla., Clovis, N. M., Albuquerque, N. M., Winslow, Ark., and Kingman, Ariz. The Government stations at St. Louis, Kansas City, Wichita and Los Angeles will complete the chain needed for communicating with the T. A. T. planes all along the route, which is expected to be in operation by June 15.

The stations will work intermediate frequencies between 600 and 900 meters in accordance with the allocation of frequencies to aeronautical services recently made by the Commission. All the T. A. T. planes will be radio equipped, carrying transmitters as well as receivers and enabling pilots and passengers alike to maintain constant communication with the ground, according to Mr. Proctor.

Field Dedications Scheduled

Dedication exercises are being arranged for several airports. The DeKalb County Airport Co. at DeKalb, Ill., has opened its airport, 10 mi. south of this city on route 23. The date of the official dedication has not been announced.

Dedication of the Douglas-Agua Prieta Airport in Arizona and the state of Sonora, Mexico, on April 6, will take on an international flavor. The field includes about 1,294 acres, each community contributing about half of this area. Floodlights and beacons are included.

On July 4, Arcadia, Fla., willl dedicate its new airport of 115 acres and 8 runways located two miles east of Arcadia. The field has a two plane hangar and is well marked.

The Evansville, Ind., Municipal Airport is to be formally dedicated in July. Buildings and beacons probably will be ready for use by July 1.

Southern Service Cancelled

NEW ORLEANS, LA.—Air passenger service between this city and Houston, Tex., recently inaugurated by the Gulf Air Lines, Inc., has been cancelled by the Southern Air Transport, Inc., which has taken over the former company.

Aero Branch Reports Airway Construction

WASHINGTON, D. C.—The survey of the last section of the airway between Redding, Calif., and Medford, Ore., is nearing completion, according to the Aeronautics Branch, while the Buffalo-Albany section has already been finished and preparations are being made to advertise for the installation of lights. The Indianapolis-Dayton airway survey is almost complete for lights; the Waynoka-Wichita section is finished; and the Gallup-Clovis section is well progressed. Surveys of the Detroit-Bay City section and of the Pittsburgh-Cleveland section of the Washington-Cleveland airway will be started soon.

On the Cincinnati-Indianapolis section a number of towers have been erected and the work is progressing as fast as weather conditions permit. On the Indianapolis-Chicago section all but four towers are up and the work is progressing rapidly.

The Evansville-Lafayette section has been contracted for and work will probably be started soon, while construction of the Kansas City-St. Louis airway has been begun. Towers have been erected on the St. Joseph-Omaha section and most of the beacons have been installed. The Apex-Salt Lake section is reported about 70 per cent. completed. The Portland-Seattle section contract has been awarded and work will be started at once.

Kentucky Adopts Federal Rules

LOUISVILLE, KY.—Adoption of the Aeronautics Branch air commerce regulations to govern the flying activities in this state was one of the first acts at the first meeting of the recently created Kentucky Air Board here. The Board discussed the general problem of encouraging airport development throughout the state, recommending that communities undertake construction of landing fields as soon as possible and install hangars, lighting and other accessories later on at their convenience. The Board will investigate the possibility of state construction of roads to established landing fields.

Kansas Airport Bill Passed

WICHITA, KAN.—The municipal airport bill of Kansas has become a law. This bill, sponsored by Wichita aviation leaders, provides for a half mill levy for the establishment, support and maintenance of airports. It gives Wichita, on the face of present tax valuations, some $63,000 annually for the new municipal airport. All airport powers will be vested in the board of park commissioners in those cities which have such board.

Weather Station for Albany

ALBANY, N. Y.—Removal of the pilot balloon station now located at Ithaca to the Albany airport has been sanctioned by the United States Weather Bureau at Washington and the service wil be started here by July 1, according to Gustave S. Lindgren, Albany meteorologist.

Statue on Capitol Now a "Beacon"

WASHINGTON, D. C.—Bright illumination of the Statue of Liberty atop the dome of the Capitol has made the bit of sculpture a sort of night flying beacon. Four 1,000 watt searchlights now play on the statue from dusk to dawn so that it will be visible to all night fliers in that territory, especially air mail pilots, two of whom have narrowly missed crashing into the statue under poor visibility conditions.

The last close shave was that of Ambrose Banks of Pitcairn Aviation who saw the Capitol dome loom suddenly through the fog and veered off with not much space to spare. Pitcairn officials requested the Government to illuminate the dome or install a beacon and the floodlighting has resulted.

Post Office Reports Growth in Air Mail

WASHINGTON, D. C.—The daily average for air mail carried over the 23 routes in February was slightly more than 200 lb. more than the daily average for January. The poundage for February was 435,581 as compared with 475,931 for January and 153,363 for February last year. The report by routes is as follows:

	Mileage	Dec. 1928	Jan. 1929	Feb. 1929
Bos.-N. Y.	192	8,344	7,727	6,198
Chi.-St. L.	278	7,185	5,952	5,538
Chi-Dallas	1,059	29,813	23,808	21,203
Salt L.-L. A.....	600	65,624	50,478	50,127
Salt L.-Pasco ...	530	20,238	15,235	14,616
Seattle-L. A.....	1,099	20,267	17,145	16,085
Chi.-Minn.	503	14,003	9,307	8,982
Cleve.-Pitts.	123	11,962	10,445	8,156
Chey.-Pueblo	199	8,099	7,176	6,626
Cleve.-Louisville.	345	6,262	6,668	6,497
N. Y.-Chi.	772	126,179	128,085	101,596
Chi.-S. F.	1,018	142,897	118,507	114,775
N. Y.-Atl.	763	20,906	21,490	18,537
Albany-Cleve. ...	446	7,679	8,134	6,678
Dallas-Galv.	318	3,846	3,681	3,383
Dallas-Lar.	423	6,736	6,064	5,468
Atlanta-N. O. ...	483	4,352	4,462	3,125
Chi.-Cin.	270	5,286	6,243	7,056
Atl.-Miami	622	5,841	6,083	10,291
G. Falls-Salt L...	489	5,121	4,163	3,606
Chi.-Bay City....	522	8,693	7,533	8,452
N. O.-Houston ...	319	....	1,097	1,482
Chi.-Atl.	785	7,779	6,438	7,104
TOTAL 13,058		537,113	475,931	435,581

Scheduled Daily Mileage 30,863.

Weather Service for Newark

NEWARK, N. J.—A complete air mail weather service is to be installed at the local airport, according to the New York Weather Bureau. Harry Gerber, weather observer at Bellefonte, Pa., has been ordered to take charge of the new station when ready. Weather information will be available also from Hadley Field, N. J.

Kansas Air Tour Planned

WICHITA, KAN.—An All-Southwest Kansas air tour has been approved by Southeast Kansas, Inc., aeronautical division. The tour will be made this summer, according to local men.

New York Commission Developing New Plans

ALBANY, N. Y.—At its recent organization meeting here the newly appointed State Aviation Commission got off to a flying start by several decisions of importance to aviation in this territory. The Commission placed an order for equipment for 11 supplementary weather observation stations, announced plans for creation of an advisory committee covering every phase of the industry within the state, and discussed proposals for a state-wide air tour and extensive airway marking.

The weather stations are to be at Oneonta, Elmira, Watertown, Hornell, Dansville, Olean, Jamestown, Lake Placid, Hancock, Middletown, and Plattsburg. It is expected they will be in operation this summer. Information will be sent twice a day to Albany for tabulation and broadcast over the state.

The proposed advisory committee would include representatives of airplane and engine manufacturers, commercial pilots, aviation press, air mail contractors, airport operators, and the Federal Government. In this way the commission hopes to keep in close and constant touch with all phases of the industry in this state.

The state-wide air tour would include the New York National Guard planes and as many other machines as may be added. It will cover the entire state and will take place, according to plans, in July or August under the auspices of the N. A. A.

Large arrows 100 ft. long and 14 ft. high painted in black and yellow would be placed every 50 or 60 mi. along the airways, it is claimed, with the name of the next city on the route displayed. Secretary F. Trubee Davidson of the Army told Gov. Franklin D. Roosevelt, preceding the meeting, that the development of the state's commercial system would be the best assistance it could give to the general development of the system of national defense.

W. A. E. Enters Missouri, May 1

KANSAS CITY—The Western Air Express now plans to start operation to Missouri points on May 1. The announcement was made here by James G. Woolley, vice president of the company, after a conference with Lou E. Holland, executive manager of the chamber of commerce and city officials. The line will operate between here and Los Angeles on a 13 hr. schedule with the return schedule being 11 hr. The fare will be about $175. Eight 12 passenger Fokker F-10 planes will be used.

May Bid Soon on New Route

CLEVELAND, O.—It is understood the Post Office Department soon will ask for bids on the Cleveland-Washington, D. C., route, now being lighted, giving Michigan a direct air mail connection with Washington and the South. The Thompson Aeronautical Corp. is to take over the spur line now operated by the National Air Transport between Detroit and the transcontimental line at Toledo, according to the reports here.

Fairfax Airport Plan Announced

Elaborate Landscape and Building Work to Start April 1

KANSAS CITY, KAN.—Elaborate landscaping as well as a set of ornate buildings will feature the development at Fairfax Airport here for which $400,000 recently was provided. The work is to start April 1, or as soon after that as the ground can be worked. The first unit will be the administration building finished in Spanish style. Plans for this year include also two sales and service buildings, a large commercial hangar, and a concrete apron.

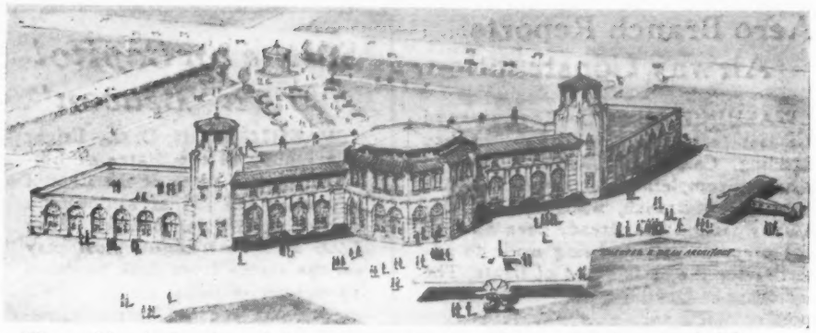
The $75,000 headquarters structure will be in the southwest corner of the field and will consist of a central section 140 ft. long and two stories high with one-story wings 78 ft. long flanking it at an angle on either side. The central part will be devoted to waiting rooms, rest rooms, offices, pilots' quarters, hospital room, and control apparatus. The latter is concentrated in a projecting section which commands a view of the whole airport and buildings.

About $15,000 has been set aside for landscaping purposes, according to the airport company. The developments along this line will include a mirror pool and sunken gardens on the street side of the building and miscellaneous plantings in front of the other buildings which eventually will flank the main unit running along two sides of the airport. It is planned to make the plant a show place which will attract visitors as well as those who are directly connected with the flying activities.

To Start Apron in Spring

The sales and service buildings will be 100 by 200 ft. and the new commercial hangar will be 100 ft. wide by 320 ft. long, both types being of steel and brick construction including large windows. Four other structures will be erected by companies which have contracted to operate at the airport. A concrete apron 5,000 ft. long and 40 ft. wide eventually will run in front of all the buildings on the airport side. Parts of this will be started this spring also.

The American Eagle plant is across the street from the airport opposite the proposed location of the buildings to be erected by the Porterfield Flying School, now using a temporary building, and for the Curtiss Flying Service, which recently arranged to operate at the airport.



The architect's drawing of the proposed Fairfax Airport administration building.

Friez to Equip T. A. T. Stations

BALTIMORE, MD.—Complete meterological equipment for Transcontinental Air Transport, constituting probably the most comprehensive system ever developed by a single company, is to be supplied by Julien P. Friez & Sons, of this city, division of Consolidated Instrument Co., it is reported.

Capitol May Get Three Lines

WASHINGTON, D. C.—Three new passenger air lines are expected to begin operation between Washington and nearby cities this spring. International Airways is said to be planning a service to New York City using six-passenger cabin planes. Another service will operate to Pittsburgh and this may be extended to connect with points in Northern Virginia.

Boeing Will Develop Burbank Site at Once

BURBANK, CALIF.—A further announcement in connection with the recently purchased 240 acre Boeing Airport here states that the company will immediately develop it into a A1A airport with no runway shorter than 4,000 ft. and one runway at least a mile in length. It was said that $500,000 has been made available for the work necessary to develop this field and make it the southern terminal for the Pacific Air Transport Co., Boeing subsidiary carrying mail and passengers between Los Angeles, San Francisco and Seattle.

The Burbank field wil be developed for flying school activities; airplane taxi service; charter flights; a spare part, overhaul, and supply depot; for inspection and insurance service; and for display rooms for Boeing and allied companies, according to the official statement.

Would Permit Dropping Mail

WASHINGTON, D. C.—Dropping air mail from mail planes as they fly over the destinations of the mail carried, is to be provided for in a bill which Representative Clyde Kelly of Pennsylvania says he will introduce at the next Congress in December. In announcing his plan to arrange for such a practice, Representative Kelly stated that the Post Office Department is working on a device to catch the official mail sack, which also is being developed. Various schemes for sorting mail en route and of dropping and picking up sacks "on the fly" are being worked out by air transport companies as well.

Texas Transfer Point Named

BIG SPRING, TEX.—The airport here will be the division point for Western Texas air passenger service operated by Texas Air Transport, Inc., under the terms of a contract signed by the Big Spring Airport Co. and the concern.

Alameda is Promised Another Big Airport

ALAMEDA, CALIF.—Another airport is promised this city with the favorable vote on the question of reclassifying certain lands outside the airport zone in the recent municipal elections. The San Francisco Bay Airdrome Co. is now able to proceed with the development of the tract under question which is but 20 min. from the financial district of San Francisco, 3 min. from Oakland and about 10 min. from other cities grouped about the east side of the Bay. It is five miles from Oakland Airport.

Lynn Schloss of Western Air Express announced that work on the field will be started at once. It will take about two months to complete the field after work has started. Four hangars and an administration building will be erected later. The field is 2,500 ft. long. The surface will be of macadam, according to reports. When completed it will be a terminal for the Western Air Express.

Varney Launches New Line to Coast on June 1

PORTLAND, ORE.—Varney Air Lines has been notified by the Aeronautics Branch to be prepared to extend its Pasco, Wash.-Salt Lake City air mail line west to Portland through the Columbia gorge by June 1. Government survey and lighting of the Columbia Gorge airway is progressing rapidly.

This extension will tie in with the company's plan for a passenger line between this city and Salt Lake City connecting with the transcontinental. It was stated that with the opening of the new service headquarters of the line may be removed from Boise, Ida., to this city. Negotiations have started regarding construction of a concrete and steel hangar here to cost between $55,000 and $75,000.

T. A. C. Opens Traffic Office

DETROIT, MICH.—A division traffic and sales office has been opened here by Thompson Aeronautical Corp. with C. R. Speers in charge. All traffic matters in this city, Pontiac, Flint, Saginaw and Bay City, all of which are points on Cleveland-Bay City route to be opened April 1, will be handled by him as well as airplane sales for the state.

FOREIGN ACTIVITIES

Foreign News Briefs

The 20th anniversary of the cross-channel flight of Louis Bleriot will be celebrated at Calais July 25 by special programs under the auspices of the Aero Club of France and the Jigue Aeronaue de France.

The English sport flying season featuring a series of air meets will be opened March 29 and 30 with the annual meet at Lympne under the auspices of the Cinque Ports Flying Club.

The proposed air service between Tokio and Dairen which is scheduled to be opened soon may be coordinated with the operation of the trans-Siberian expresses.

Practically all airplanes of the British Air Force are now of all-metal construction as compared with general wood construction which prevailed until recently. The new all-metal planes are said to be much lighter than their wooden counterparts.

French military and civilian planes will stage a giant air display at Vincennes, May 19 and 20, under the auspices of the Aero Club of France. The exhibition will include various military exercises and demonstrations and competitions between military and civilian pilots.

Van Lear Black, Baltimore publisher, who recently completed part of his round-trip flight between London and Cape Town, is being held up in Northern Rhodesia by the illness of his pilots. The flight back to England will be resumed within a few days, it is expected.

A pilotless Japanese training plane being used in testing a new catapult flew wild over towns and countryside when a time switch, which was expected to halt the plane after the launching, failed to operate. Before the machine finally dove to the ground a total wreck, native and flying officials were thoroughly alarmed, as the machine cavorted around through the air entirely out of control.

Sir Samuel Hoare, British Air Minister, recently admitted that the two British airships now nearing completion have been a more costly experiment than had been anticipated when the work was projected.

Runways have been completed at the Lulu Island temporary airport for Vancouver, Canada. The main runway is 100 ft. wide and 2,500 ft. long. It will be opened officially in April with an air display.

An air equipment section at the Canadian Pacific Exhibition at Vancouver has been made possible through the pledged support of leading manufacturers in Canada and the United States.

K. L. M. Has Busy Year

AMSTERDAM, HOLLAND.—The Director of the K. L. M. Air Line states that in 1928 the line carried out 535 round trips between Paris and Amsterdam with its Fokker-Jupiter machines. Throughout the entire year no journey was cancelled for technical reasons. During the summer season from April 15 to the end of September, the K. L. M. ran a service three times daily in each direction without having either a reserve machine or a reserve engine at Le Bourget. The K. L. M. machines in service during 1928 comprised five twin engined Fokker-Jupiters and seven single engined Fokker-Jupiter machines. The total distance flown was 1,087,397 mi. in 10,287 flying hr.

German Air Freight Increases

BERLIN, GERMANY.—Air freight handled by the Luft Hansa planes jumped from 1,413,571 lb. in 1927 to 2,270,758 lb. in 1928, the company reports. Extra planes were required on many trips. Traffic on the lines connecting this city with Paris, Amsterdam, Copenhagen, and Vienna was particularly heavy while the planes between here and Moscow and Madrid were heavily patronized. Expansion of the traffic is anticipated in the coming season.

French Make More Planes

PARIS, FRANCE—During last year, 1,440 airplanes and 1,800 airplane engines were manufactured in this country. In 1927 about 1,150 airplanes and 1,800 engines were produced, according to reports. The majority of planes were military machines, many going to Yugoslavia, Rumania, Greece, Switzerland and Brazil. Exports of airplanes decreased in 1928 from more than $7,715,000 the year before to $5,500,000. Seaplane exports decreased.

Canadian School Chain Started

MONTREAL, CANADA—The Continental Aero Corp. of this city is opening a chain of flying schools throughout Eastern Canada in addition to their present local school. Chief Pilot J. H. St. Martin visited the plant of the Mohawk Aircraft corp. at Minneapolis and took delivery on a Mohawk Pinto equipped with skiis for use in the school. Five other Pintos have been ordered.

British Plan Cape Service

LONDON, ENGLAND—The Air Ministry reports it has about completed arrangements for a second Imperial air trunk line connecting this country with Cape Town. Negotiations between various African governments are being pushed, and early operation of the line is hoped for. In the meantime, every effort is being made to open the service to India within the next few weeks.

France and Italy Sign Reciprocal Air Pacts

PARIS, FRANCE.—Direct air connections between this city and Italy appear assured with the conclusion of an Italio-Franco agreement allowing each country reciprocal rights for the use of certain air bases. Commercial expediency seems to have reversed a long standing policy of each country to exclude planes of either nation from using these bases for military reasons. A line connecting this city with Rome and another to Milan have been reported likely in the near future.

The air bases at Marseilles, Tunis, Sardinia, Naples, Brindisi and Castlenuevo have been mentioned as included in this reciprocal agreement. France is pleased as it gives the country equal rights in Italian territory with England and Spain, both of whom have already made pacts with Italy. Negotiations between the two countries over reciprocal flying arrangements in Africa are not progressing as smoothly as desired.

Mexicans Cut Service

MEXICO CITY, MEXICO—Planes which have been operating on the air mail service between this city and Laredo, Tex., now fly only as far as Saltillo where the mail is transferred to trains. The mail planes leave here at 11:30 A. M. and reach Saltillo at 6:15 P. M. and the mail reaches Laredo for connection with the American mail planes at 7:10 the next morning. On the return trip the mail planes arrive here at 1:30 P. M. Elimination of night flying and economy were given as reasons for the change.

English Braking Device Tested

LONDON, ENGLAND.—The first standard aircraft brakes suitable for large machines produced by an English manufacturer are reported to have been developed here by Vickers, Ltd. A de Havilland Hercules for the Western Australian Airways has been equipped with the brakes and a tail wheel with brake to replace the tail skid. It is said that an eight ton plane landed at Croyden during tests at 45 m.p.h. and stopped within 100 yd.

Curtiss-Reid Building Plant

MONTREAL, CANADA—The Curtiss-Reid Aircraft Co., Ltd., of Canada, now building two planes of Reid-Rambler type a week, has started construction of an airplane manufacturing plant here capable of turning out between 350 and 400 planes a year. Marketing of this machine in South America is being handled by the Curtiss Aeroplane Export Co. The local company, on the other hand, is to handle sales for Curtiss-Robin and Sikorsky planes in Eastern Canada.

BUYER'S LOG BOOK

B. B. T. Floodlight

ANNOUNCEMENT HAS been made by the B. B. T. Corporation of America, Atlantic Building, Philadelphia, Pa., of the development of a new type of intermediate floodlight. This new airport lighting unit is known as the Type H-8-E intermediate landing floodlight.

The Type H-8-E Floodlight is constructed of Monel metal and is equipped with a 500 m/m element, hand-ground, hand-cut Fresnel lens. The reflector is a 12 in. spherical mirror with an adjustable focal arrangement. The entire unit is 6 ft. 2 in. high, 1 ft. 10½ in. wide and 3 ft. 5 in. deep.

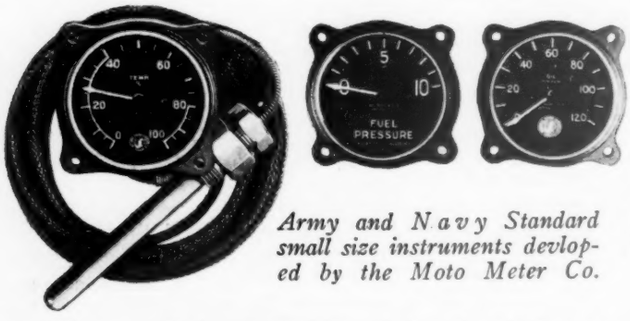
Type H-8-E Floodlight.

One 10 kw. lamp is employed as a light source but the unit is made large enough to accommodate a lamp changer if desired. A fan ventilator with shutter is provided and a manually operated resistor panel to control lamp voltage is also furnished.

Moto Meter Instruments

THREE NEW aircraft instruments have been developed by the Moto Meter Company, Inc., Long Island City, N. Y., and were adopted at the recent Army and Navy Conference at Philadelphia. These instruments are known as Army and Navy standard small size fuel pressure gauge, oil pressure gauge and engine thermometer.

The pressure gauges are the usual Boudon tube type and the thermometer is of the vapor tension type, the unusual feature of the thermometer being that it has an evenly graduated scale. The usual vapor tension scale opens up considerably the higher the instruments gets, due to the fact that the coefficient of expansion of the filling material is not constant. This unevenness of coefficient of expansion has been overcome in the mechanism of the new type thermometer.



Army and Navy Standard small size instruments devloped by the Moto Meter Co.

SIDE SLIPS

By ROBERT R. OSBORN

Now that the Society for the Aeronautical Education of Newspaper Correspondents and Artists has accomplished so much good work in its chosen field, we have time to look to other fields which are in need of improving. Mr. C. E. H. of Hempstead, N. Y., suggests opening a section devoted to the aeronautical education of stock brokers, and encloses a circular to prove the distressing conditions in Wall Street. We quote from the circular: "Telegraph dispatches from Lincoln, Neb., state that the Lincoln Aircraft Co., Inc., has just closed an agreement with the Wright Aeronautical Corporation of Paterson, N. J., whereby Lincoln Aircraft has secured the exclusive manufacturing and sales rights in the United States and Canada for the Wright-Morehouse airplane engine. This is an air-cooled 29 hp. engine weighing 89 lb. and having a speed of over 85 m.p.h. . . . It has a cruising speed of 80 m.p.h., a landing speed of 30 m.p.h. and can cruise 32 mi. on one gallon of gasoline."

Apparently Dr. Junkers and other exponents of the "flying wing" aren't so visionary as we thought. What could be better than a flying engine?

* * *

The news reports that the Mexican rebels are offering California pilots $250 a day to fly for them during the revolution. As it is our impression that the California fliers spend most of their flying time repairing landing gears and overhauling engines in flight, we suppose the rebel strategy will be to have them put on a little show over the camp of the federal troops, who can then be captured easily,—looking up with their mouths open.

* * *

"LAUNCH CAMDEN AIRPORT"

Apparently Camden has geen getting some of its airport ideas from its across-the-river neighbor, Philadelphia, which, according to our own observations and other reports has one of the finest collections of under-water airports in the United States.

* * *

The Intrepid Aviator has asked us to announce that all of these big companies which have been going on in the industry have not affected him in any way, and he and his Jenny are still independent. He says that some unscrupulous bankers have claimed connection with him and his plane in order to run up the value of their stock.

* * *

A divorce suit in Chicago has revealed a man who has an income of only $15 a week and yet flies his private airplane all of the time. Some airplane company is overlooking a wonderful opportunity to get a worthwhile testimonial.

* * *

According to the announcements, a new airplane manufacturing company intends to specialize in airplanes for women and, as their first plane is to be amphibian, we think they must know pretty well what they are doing. If the gear is arranged so that the ship could land on either land or water, or both simultaneously, the lady pilot can change her mind as often and as suddenly as she likes without danger.

Inspiration
for prospective AIRCRAFT SALESMEN

You, sir, are thinking of selling airplanes. As a man of good judgment you will want to connect with a popular ship, a strong, established organization, and a manufacturer that will help you to success. You want to be *sure* of these things before you put your capital and energy to work.

You should *know* the Alexander Aircraft Company. You should *know* what the largest aircraft sales organization in the country is doing—and *why* an EAGLEROCK franchise is most valuable. Read and judge where your opportunity lies:

Random Examples of Distributor Success

Dr. Geo. Bennett, formerly a practising dentist, now operator of one of the largest flying schools in the country, sold four EAGLEROCKS during February. This is no fortune in commissions but a mighty good income for the twenty-eight days known as a dull month.

Jack Frye, once operated a few ships on a small scale. Now his company has a profitable transport line and flying school. His company and dealer organization has been responsible for the sale of most of the eighty-two EAGLEROCKS flying in this state.

J. Shelly Charles, a lone operator and a distributor in North Carolina, Virginia and District of Columbia, has increased his net assets $26,000 in three years—and that, in the major part thru EAGLEROCK sales.

Sales Promotion

Several master sales promotion men make periodic visits in EAGLEROCKS to distributors and dealers to strengthen organizations and to help close sales.

Over one hundred Alexander Film salesmen contact with thousands of business men every week. They create EAGLEROCK prospects and render every aid possible to aircraft salesmen in their territories.

The Alexander Sales Course, a practical and proven course in salesmanship is given without charge to each new member of the national sales organization.

The Animator, a weekly newspaper, keeps every salesman of the "Industries" informed as to company progress and policies, and is a medium for exchange of profitable ideas.

Publicity

Every important aeronautical journal as well as a number of trade publications carry EAGLEROCK advertising in either black and white or in colors.

The Aircrafter, a live 24-page monthly magazine covers a field of 25,000 active prospects. Besides the home office mailings a fair portion of each issue is sent to EAGLEROCK salesmen for personal distribution.

Motion picture advertising for EAGLEROCK is shown constantly in many theatres throughout the United States. The Alexander Film Company, another division of the Alexander Industries, Inc., is the largest screen advertising company in the world. It has contracts with over 2500 theatres throughout the country. That means 8,000,000 actual reader circulation weekly, or about three times the circulation of the most widely read magazine in America.

Folders, broadsides, illustrated letters, flying instruction books, stickers, banners, post cards, etc., all enter into the list of advertising helps. A live publicity department supplies 200 publications with interesting editorial facts regarding Alexander activities and EAGLEROCK planes.

A Progressive Institution

Sales volume of the Alexander Aircraft Company amounted to over $1,008,500 during 1928. This was an increase of more than 50 per cent over the previous year.

Investment in aircraft buildings, equipment and materials was more than doubled during 1928. Immediate plans call for half a million dollars additional to be invested early in 1929. The present factory is capable of *one ship an hour* production. Volume production as practised in building EAGLEROCKS means a lower manufacturing cost with a corresponding increase in the possible market and in value to the customer.

All This Is Valuable

Every effort is made on the part of the Alexander Aircraft Company to make franchises as valuable as possible to distributors and dealers. As they prosper, so shall the company prosper and become able to render still greater value for the customer's dollar.

Opportunities for Dealers

Those who become EAGLEROCK dealers *now* have excellent opportunities to become distributors through thorough development of their territories. This was demonstrated in 1928 by Robert Westover, head of National Parks Scenic Airways and owner of a garage in Billings, Montana. As a dealer, the firm sold more airplanes during 1928 than any other EAGLEROCK dealer in the United States. In January, 1929, it was made a distributor over Montana and Western Wyoming.

Certain choice territories are still open to dealers and distributors. Write to us.

ALEXANDER EAGLEROCK

Formal Announcement of the *new* EAGLEROCK BULLET will be made in April.

J. A. McInaney, Vice-Pres. in Charge of Sales,
ALEXANDER AIRCRAFT CO., Colorado Springs, Colo.

I am interested in the purchase of an EAGLEROCK—check ☐
I am interested in open EAGLEROCK territory—check ☐

Name .....

Address .....

Business or Profession .....

"AIRCRAFT MAKERS MUST KEEP THEIR EYES ON THE CLOUDS"

A PROMINENT manufacturer writes: "I use du Pont finishes because they are made scientifically for air-service – assure me that I get the utmost in durability."

Finishes that serve on the ground cannot meet the "wear and tear" of the air. Every du Pont aircraft finish is built to stand the most rigorous stress and strain—to protect the ship against changes in temperature, weather and sun, long after old-style materials have become shabby and useless . . . When you say "du Pont finishes" the prospective buyer of a plane knows that he is getting the last word in modern chemical achievement.

Style—new beauty of color: utilize the du Pont Color Advisory Service

Duco brought style to the automobile. Now, with du Pont wing-dopes, Duco and other special finishes, you can give your ships the last word in color. The du Pont Color Advisory Service has studied aircraft "fashion" in both Europe and America and would be glad to suggest suitable harmonies. Du Pont colors were created by optical experts for visibility. In solving your finishing problems, call on the du Pont Color Advisory Service as well as the du Pont technical men.

Complete information on any du Pont product for airplane use will be furnished promptly by mail or by a qualified representative.

AIR-TESTED FINISHES

Du Pont Dopes—The du Pont line of aircraft finishing materials includes clear, semi-pigmented and pigmented dopes. They are all tested formulas of remarkable durability—proven in service as well as in the laboratory. Flexible and highly blush-resistant, the Army and the Navy have approved these products for their requirements. Available in a wide variety of highly visible colors.

Du Pont Paints and Varnishes—Du Pont chemists have developed a complete line of paints and varnishes including Dopeproof Paint, Spar Varnishes, Fuselage Varnish and Aircraft Enamels.

DU PONT

REG U.S. PAT OFF

E. I. DU PONT DE NEMOURS & CO., Inc.

Industrial Finishes Division, Parlin, N. J.

2100 Elston Ave., Chicago, Ill. 351 California St., San Francisco, Cal.

Flint Paint and Varnish Limited, Toronto, Ontario, Canada

MEMBER OF AERONAUTICAL CHAMBER OF COMMERCE

AN aircraft designer was talking: "The requirements of making 'flying machines' mean a radical departure from materials that are suitable enough for ground transportation. We are only beginning to realize the possibilities . . . I use du Pont Pyralin and Fabrikoid because they are eminently suitable for plane construction: many new uses for these very modern materials will be developed."

Du Pont Fabrikoid and Pyralin are, in their separate fields, made after the image in the imaginative aircraft maker's heart. They are light, very strong, durable, resistant to oil and fumes—stand up under the severest flying conditions. In many cases they are inevitably taking the place of older, less suitable substances. Where can they serve you?

Let us send you specific data

Pyralin, 100% transparent, is used on leading craft for windows, instrument boards and wing lights. Pyralin is available in various colors—has unlimited decorative quality.

No old-type fabric can approach Fabrikoid for cockpit or cabin upholstery. Buoyancy, gaiety, the true spirit of airplane luxury, are expressed in the designs of the new light-weight Nemoursa Aeroplane Fabrics for cabin ships. Du Pont technical men are ready to co-operate wholeheartedly with you. Please write to the division concerned.

AIR-TESTED MATERIALS

Du Pont Fabrikoid: Sturdy Fabrikoid is an ideal material for open cockpit upholstery. Will withstand all weather conditions. "Nemoursa Aeroplane Fabrics" are new type, light-weight materials developed for interior trims of cabin ships. Made on a high-grade woven cotton base and treated with appropriate pyroxylin colors. Embossed in distinctive patterns.

Du Pont Pyralin: A strong, durable, light, unbreakable, transparent material furnished in any gauge from 5-1000 upward in sheets approximately 20 in. x 50 in. Ideal for windshields, cabin windows, running lights and other uses.

DU PONT

REG U S PAT OFF

E. I. DU PONT DE NEMOURS & CO., Inc.

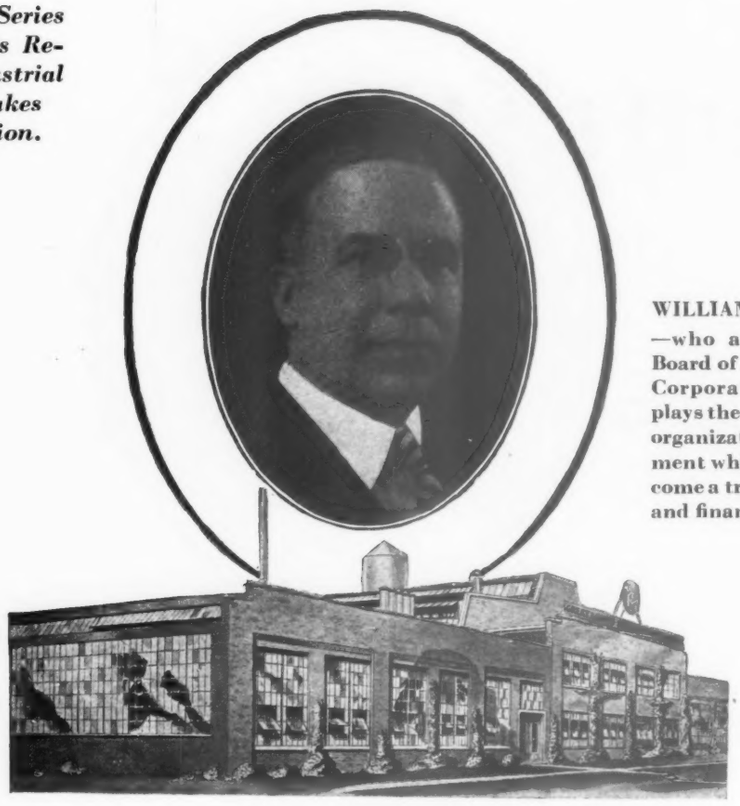
DU PONT VISCOLOID CO., Inc.

330 Fifth Avenue, New York City

FABRIKOID DIVISION Newburgh, New York

SUPPLIERS UNDER CONTRACT TO UNITED STATES GOVERNMENT

Number One of a Series of Fact-Statements Regarding a New Industrial Leader—Great Lakes Aircraft Corporation.



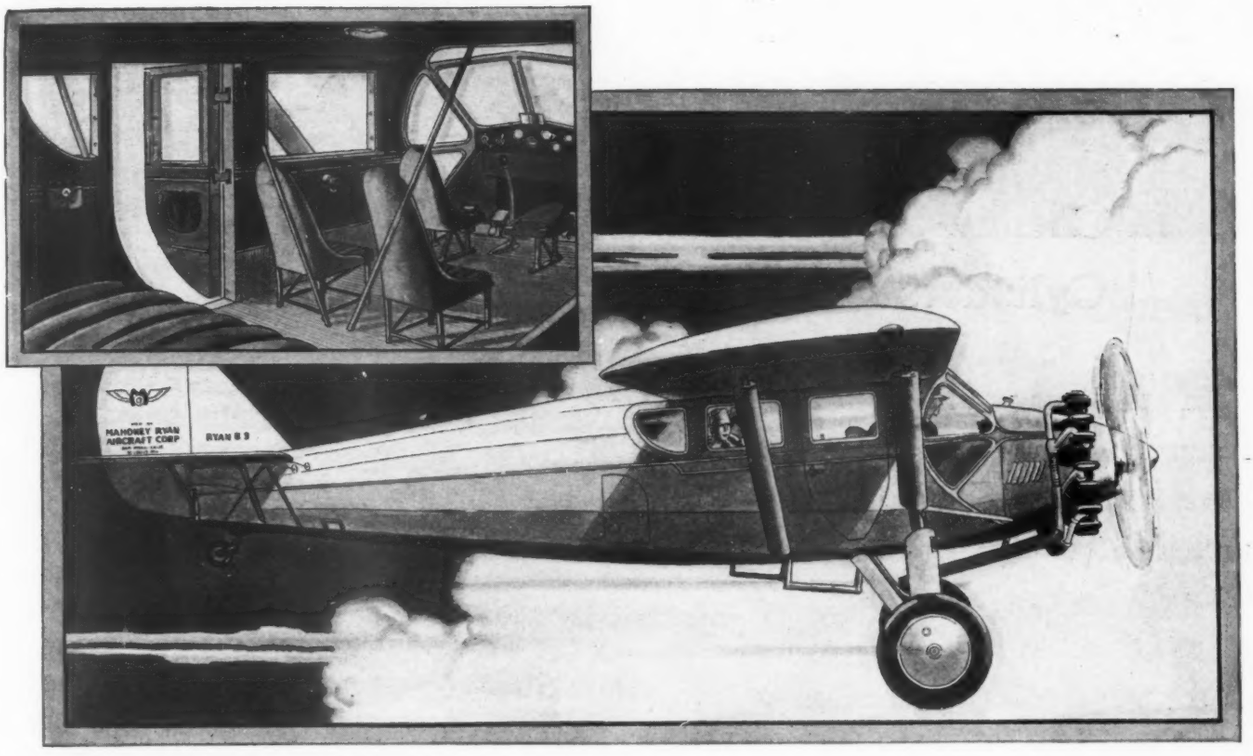
WILLIAM ROBERT WILSON—who as Chairman of the Board of Great Lakes Aircraft Corporation once more displays the remarkable talent for organization and accomplishment which has long since become a tradition in automotive and financial circles.

Responsibility

IT IS a significant fact that shrewd commentators on aeronautical matters already list Great Lakes Aircraft Corporation among the leaders of the industry. That such a position should be conceded even in advance of forthcoming production announcements is a remarkable tribute to the inherent *responsibility* of the Great Lakes organization. The frank confidence which has been placed in this powerful newcomer is born largely of respect for the brilliant past records of its executives; the high expectations which it has raised throughout the industry are deep-rooted in the firm soil of a solid engineering and financial background. Aviation expects leadership from Great Lakes Aircraft Corporation because it is headed by men who have always been leaders—and because it is in business to stay.

GREAT LAKES AIRCRAFT
CORPORATION CLEVELAND

Military and Commercial Airplanes - - - Seaplanes and Floats - - - Aluminum Alloy Parts



NEW!—Through and Through!

"An unequaled bad-weather ship," say veteran pilots of the new Ryan Brougham for Six

—And a fair weather ship beyond comparison, too—is this new Brougham, the most beautiful ship and the greatest performer Ryan ever built. The new Ryan represents the happy medium—speed, stability, maneuverability, and now perfected coachwork design puts it in a class with the finest motor cars.

"*Inherent stability*" is no longer an empty phrase. It is the verdict of every pilot who has flown this brilliant ship. "Hands off" flight is now commonplace—here is a ship which, properly balanced, will keep constant altitude at any engine speed . . . will recover automatically when the gun is cut . . . has directional stability, even at stalling speeds.

"Red" Harrigan, Ryan Chief Test Pilot, will tell you—and show you—*it is the best balanced ship in America today*. Pull the nose high in a stall and you will experience no falling off. If conditions demanded, this balanced ship could be flown and landed with the stick alone, or with only the rudder and stabilizer. *These vital qualities reach their biggest development in the Ryan.*

Exterior attractively paneled—interior in the best taste in coach design. Individual middle and control seats . . . comfortable for cross country trips. New controls give an absolutely clean floor . . . nothing to jam or catch . . . easy brake control . . . the ultimate in comfort and security.

This sure-winged Brougham is designed for first-class commercial air travel and is well adapted to special speed trips of business executives. *It takes off faster and lands slower than any other plane of its type.* The substantial performance given by the B-3 model with the Wright J-5 motor is amplified to an astounding degree in the B-5 model with the Wright J-6 motor.

Created by a substantial company which built and sold more Whirlwind cabin ships in 1928 than any other maker.

Ships of this new model are ready for early delivery through Mahoney-Ryan distributors situated at the leading airports throughout this country and abroad. Illustrated four-color brochure giving full description will shortly be available to interested individuals and corporations.

The MAHONEY — RYAN AIRCRAFT CORP'N

Lambert-St. Louis Airport — **Anglum, St. Louis County Missouri**

THANK YOU *for mentioning* AVIATION

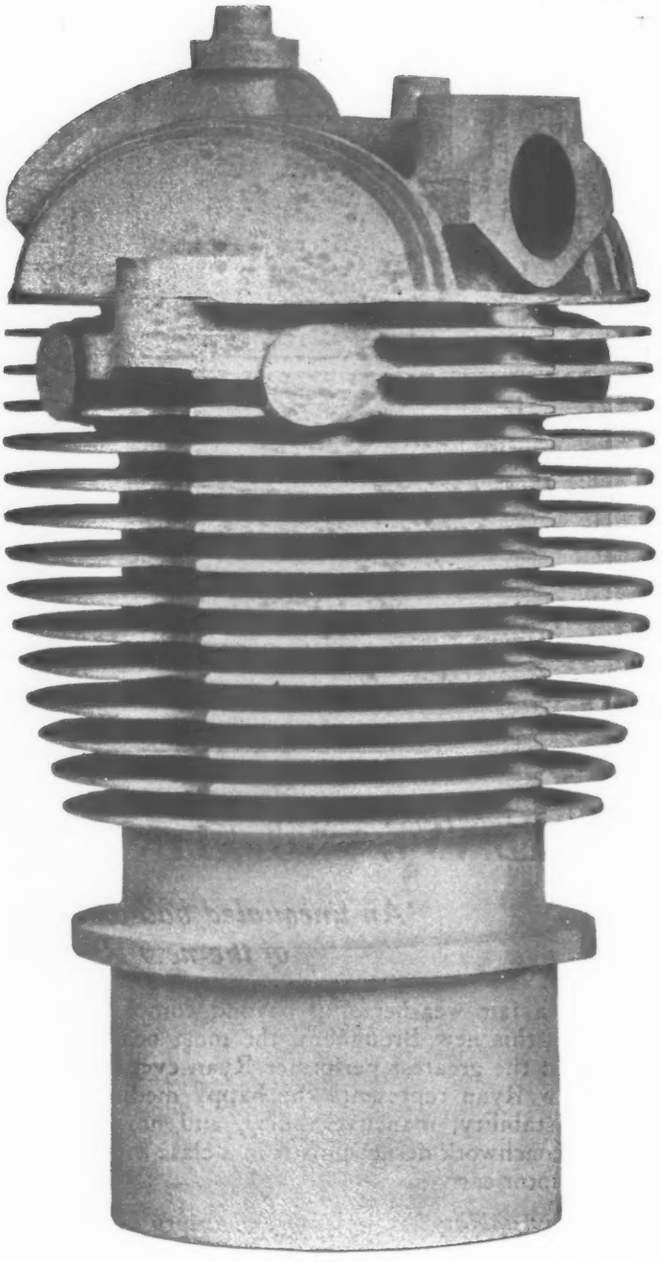
IMPROVED WEARING QUALITIES

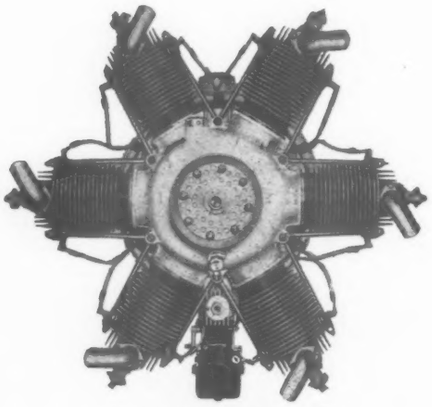
In Cheney-Cast Cylinders

In the long and thorough research work preceding the development of the remarkable nickel-iron used in Cheney-Cast Cylinders, the prime importance of wear-resisting characteristics was continually emphasized.

The resulting iron, with a uniform distribution of carbon, has exceptional wearing qualities as well as high strength-characteristics.

If you have been thinking of cast cylinders in terms of ordinary gray iron castings, it will pay you to investigate Cheney-Cast Cylinders. They are the result of twenty-five years' experience in making air-cooled cylinders.





Brownback Model C-400 Motor. Equipped with Cheney-Cast Cylinders

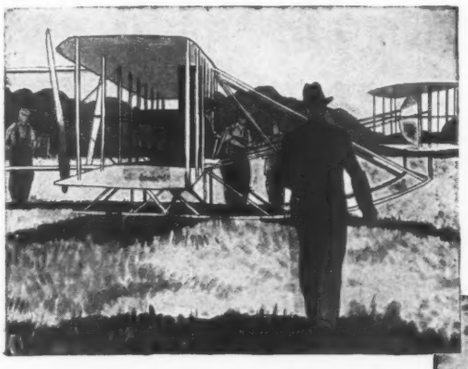
AIR COOLED CYLINDERS

S. Cheney and Son

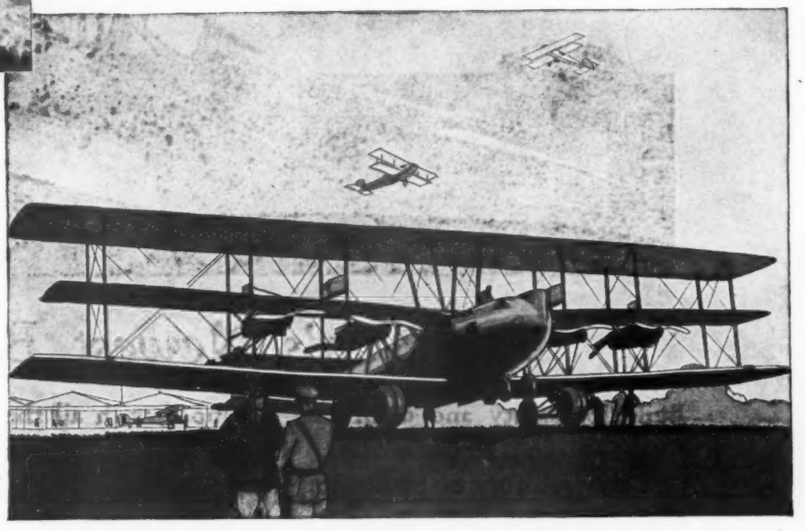
MANLIUS, N.Y.

Nearly a Quarter of a Century ago . . . and now!

The United States Government Always a Goodrich Customer



By way of contrast compare the modern airplane on the right with this old "crate."



At its mercy are enemy cities beneath this giant bomber in time of war, but the tires stand up—they're Goodrich's.

WHEN Goodrich first made aviation tires the United States Government was one of its *first* customers. And customer our Government has remained from the days of the first fabric clincher tires until this modern day of stream-line giants.

Recently Goodrich made the world's largest airplane tires for the U. S. Army's Barling Bomber. Tall as many flyers, these great rubber-and-fabric hoops measure five feet, four inches in height. A score of tail wheels could be hidden safely inside their cross sectional diameter.

Smaller sizes of this same type have long been used on planes of the War Department Air Corps, the United States Navy and on the vast majority of commercial airplanes. For it is a well established fact among both civilian and military authorities that there are no "second best" Goodrich airplane tires.

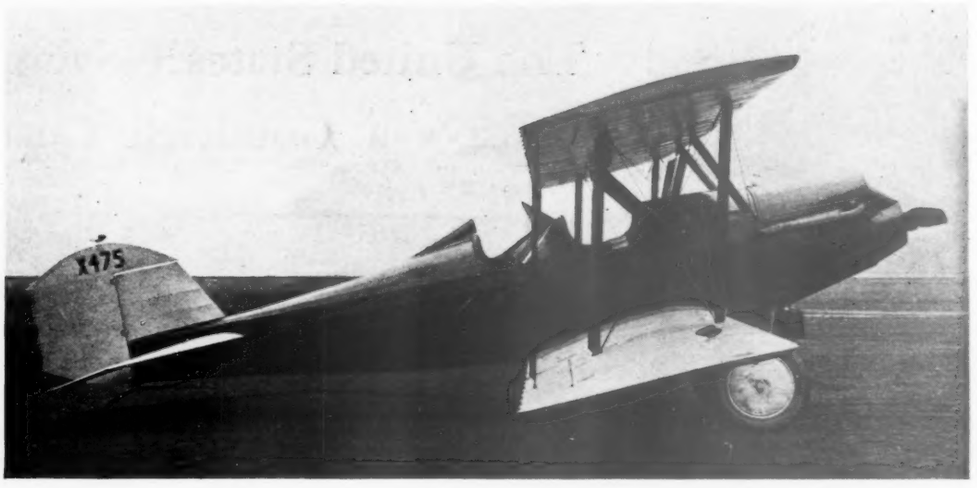
The B. F. Goodrich Rubber Company *will not* endanger life by manufacturing anything less than the *best* aviation tires that science and skill —*Goodrich* science and skill— can construct.

THE B. F. GOODRICH RUBBER COMPANY, Akron, Ohio. Established 1870. Pacific Goodrich Rubber Company, Los Angeles, Calif. In Canada: Canadian Goodrich Company, Kitchener, Ont.

GOODRICH has staked out its field in aviation. The realm of heavier-than-air-craft is its zone of endeavor. There Goodrich has pioneered . . . there Goodrich has helped to write history. And there Goodrich still leads with products as far advanced as the modern flying field is advanced over the fair ground landing lots of twenty years ago.

Goodrich *Rubber for Airplanes*

The TA-HO-MA



Aviation's Newest Bi-plane

Built for safety and comfort. Equipped with all the latest safety devices—no wires—all steel tube control. Cock-pits built sufficiently large for easy operation and comfort of both pilot and passengers. Now in production.

Price $2500 (less motor)—motor optional.

On display at the All-American Aircraft Show—Detroit, Michigan—April 6-14. Buffalo Aviation Show, March 23-30. We invite your inspection.

Distributing Dealer's Territories open. Write for full particulars.

Specifications

DIMENSIONS:

Length overall	21′
Height overall	8′
Span	32′
Chord	60″

AREAS:

Wings	312½ sq. ft.
Horizontal tail planes	33.2 sq. ft.
Vertical tail planes	8 sq. ft.

WEIGHTS:

Weight empty (Curtiss Challenger) 170 H.P.	1390 lbs.
Useful load	1357 lbs.
Pay load	795 lbs.
Gross weight	2749 lbs.

CONSTRUCTION:

Fuselage—Welded steel tubing, cover fabric.
Wings—Spruce spars and ribs. Fabric covered.
Ailerons—Steel tubing Fabric covered.
Tail planes—Steel tubing. Fabric covered.
Landing gear—Split axle, tread 7′4″.

EQUIPMENT:

Tachometer, altimeter, oil pressure gauge, oil temperature gauge, switch, choke, gas shut-off, gasoline gauge for each tank, compass, air speed indicator, fire extinguisher, safety belts, navigation lights, dual control.

PERFORMANCE:
(170 H.P. Curtiss Challenger)

High speed	125 M.P.H.
Cruising speed	105 M.P.H.
Landing speed	35 M.P.H.
Ceiling	18000′
Climb	1000′ P.M.
Fuel capacity	60 gals.
Cruising radius	650 M.

TA·HO·MA
Fly in Safety

AIRPLANE & MOTOR CO., 64 WEST RANDOLPH STREET, CHICAGO, ILLINOIS

This advertisement appears as a matter of record only.

2,000,000 Shares

The Aviation Corporation

(Incorporated under the laws of Delaware)

Common Stock

CAPITALIZATION

(*As of March 7, 1929*)

	Authorized
Common Stock (*No Par Value*)	10,000,000 shs.*

The number of shares of Common Stock presently to be outstanding will consist of the 2,000,000 shares being publicly offered and any shares presently issued in connection with the acquisition of interests in other companies.

*Including 1,250,000 shares reserved for sale at $20 per share under options, granted or to be granted to the organizers, bankers and management, excercisable January 1, 1930 to December 31, 1936, inclusive, the number of shares deliverable upon exercise of these options being subject to increase in case of stock dividends on outstanding Common Stock. A part of these options is to be reserved for executive and technical personnel not yet in the Corporation's employ.

The following information is contained in a letter dated March 7, 1929 from Mr. Graham B. Grosvenor, President of the Corporation:

PURPOSE

"The Aviation Corporation has been organized primarily as a holding and development company for the aviation industry. The Corporation aims to make available to its subsidiary and affiliated companies technical and management cooperation, as well as financial resources beyond those which would be at the command of any single unit. While it is anticipated that its holdings will consist largely of the majority of the common stocks of other companies, it may also own interests in companies not controlled. In either case, such companies may be established concerns or new organizations created for experimentation, development, investment, manufacture, sales, or operation of aircraft.

TECHNICAL STAFF

Although commercial aviation is already a substantial industry and a factor in the transportation system of the country, experimental and developmental work is still of great importance. It is hoped that this Corporation will play a significant part in the technical and commercial advancement of aviation in this country. It intends therefore to maintain a staff of experts versed in all important aspects of the industry. This staff will cooperate with the active managements of the companies in which the Corporation is interested as well as investigate aviation and related projects, and carry on experimental and development work directly for the Corporation. A part of the options on Common Stock will be reserved for the members of this technical division, which, it is expected, will be headed by Col. Thurman H. Bane, who served in a similar capacity as Chief of the Engineering Division of the Army Air Service, and will include, among others, at the outset Col. V. E. Clark, formerly Chief Aeronautical Engineer, U. S. Army, and C. Fayette Taylor, M.E., (in consulting capacity).

ORGANIZATION

The Aviation Corporation is at present negotiating for substantial interests in several large established companies in the field representing various phases of the industry. These acquisitions, it is expected, will be effected in the near future largely through the issuance of Common Stock of the Corporation and, in some instances, options to purchase Common Stock. The Corporation will receive $35,000,000 in cash as the proceeds of the present financing.

The officers of the Corporation will include W. A. Harriman as Chairman of the Board of Directors, Graham B. Grosvenor as President, Robert Lehman as Chairman of the Executive Committee, and George R. Hann as Vice Chairman of the Executive Committee.

In addition to the above officers it is expected that the Board of Directors will include, upon completion of the present financing, the following:

Frank Andrews, Attorney, Houston, Tex.; L. W. Baldwin, Pres., Missouri Pacific Railroad Company; Harold O. Barker, Jesup & Lamont; William G. Beckers, Director, Allied Chemical & Dye Corporation; C. K. Boettcher, Boettcher & Co., Denver; D. K. E. Bruce, W. A. Harriman & Co., Inc.; Matthew C. Brush, Pres., American International Corporation; Rogers Caldwell, Caldwell & Company, Nashville; Frederic G. Coburn, Sanderson & Porter, New York; W. W. Crocker, Vice-Pres., Crocker First National Bank of San Francisco; John W. Cutler, Edward B. Smith & Co.; R. Stanley Dollar, Vice-Pres., Dollar Steamship Line; Sherman M. Fairchild, Pres., Fairchild Aviation Corporation; Edward P. Farley, Chairman of the Executive Committee, American Hawaiian Steamship Company; John M. Franklin, Vice-Pres., Roosevelt Steamship Company, Inc.; John C. Grier, Jr., Pres., Guardian Detroit Company; Stanley J. Halle, Halle & Stieglitz; John W. Hanes, Chas. D. Barney & Co.; George M. Holley, Pres., Holley Carburetor Company, Detroit; A. L. Humphrey, Pres., The Westinghouse Air Brake Company; James M. Hutton, Jr., W. E. Hutton & Company, Cincinnati; W. F. Kenny, Pres., Wm. F. Kenny Co., New York; John L. Lancaster, Pres., The Texas and Pacific Railway Company; Robert Law, Barnsdall Corporation; William Dewey Loucks, Attorney, New York; Alan J. Lowrey, Vice-Pres. and Manager, Crocker First Company, San Francisco; C. Townsend Ludington, Pres., Ludington Philadelphia Flying Service, Incorporated; Paul M. Mazur, Lehman Brothers; George Mixter, Vice-Pres., Division of Aeronautics, Stone & Webster, Incorporated; Harry S. New, Formerly Postmaster-General of the United States; Maurice Newton, Halgarten & Co.; Edward J. Noble, New York; Roland Palmedo, Lehman Brothers; Charles M. Parker, Executive Committee, American Radiator Company; Major General Mason T. Patrick, (Retired), Former Chief of Air Service, U.S.A.; Harry C. Piper, Vice-Pres., Lane, Piper & Jaffray, Inc., Minneapolis; Joseph W. Powell, Engineer and Shipbuilder, Boston; Frederick S. Pratt, Vice-Pres., Stone & Webster, Incorporated; Samuel F. Pryor, Chairman, Executive Committee, Remington Arms Co.; J. S. Pyeatt, Pres., Denver & Rio Grande Western Railroad Company; George M. Pynchon, Jr., Pynchon & Co.; Edwin B. Reeser, Pres., American Petroleum Institute; James A. Richardson, Pres., Western Canada Airways, Limited, and Director, Canadian Pacific Railway Company; Alexander B. Royce, Attorney, New York; William B. Scarborough, Hitt, Farwell & Co.; C. B. Seger, Chairman, Finance Committee, Union Pacific Railroad Company; John D. Siddeley, C.B.E., Chairman, Armstrong Siddeley Development Company, Limited, Coventry, Eng.; Lloyd W. Smith, Pres., The Union National Bank, Pittsburgh; Sidney W. Souers, Executive Vice-Pres., Canal Bank and Trust Company, New Orleans; Eugene W. Stetson, Vice-Pres., Guaranty Trust Company of New York; G. H. Walker, Pres., W. A. Harriman & Co., Inc.; Harvey L. Williams, Pres., Air Investors, Incorporated; Robert W. Woodruff, Pres., The Coca-Cola Co.

HAZARDS OF INDUSTRY

Although the future of aviation as a manufacturing and transportation industry appears assured, there is no doubt that it will experience many vicissitudes before becoming thoroughly established and stabilized. Many individual companies will probably fail to fulfil the promise now held out for them, whereas new organizations, as yet obscure or not yet in existence, will become strong units in the industry. Moreover, many aviation companies are at present sacrificing the opportunity for immediate profits to the endeavor to prepare their organizations, in personnel, equipment and product, for what they may regard as the future demands to be met. It is believed that a company, such as The Aviation Corporation, with large resources of capital and personnel, will be able to be of constructive assistance to many aviation enterprises in developing their strength and earning power. However, any investment in the industry is hazardous, and must be regarded in the light of a speculation."

This offering was made in all respects when, as, and if issued and accepted by us and subject to the approval of our counsel, at

$20 Per Share

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No. B-800

$36.00

The Van Dorn 3/16" Electric Drill

THIS drill is designed especially for the manufacture and maintenance of airplanes - where drilling is through wood and sheet metal requiring high speed and a light weight tool.

It is designed so that its length is 8½ inches making it an ideal tool for work in close quarters.

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Weight . . . . . 4⅓ lbs.	Drilling Capacity . . . . 3/16" in steel
Length . . . . . 8½ inches.	Equipment: 3-jaw chuck, 10 feet electric cable with plug.
Speed, no load . . . . 5000 R. P. M.	Universal Motor - Operates on D. C. or A. C.
" full load . . . . 3000 R. P. M.	

Furnished for 110, 220 or 250 volts.

The "Van Dorn" Electric Tool Co.
Cleveland, Ohio.

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is an *American Eagle* prospect!

The man who owns an American Eagle sales franchise never loses a customer through failure to supply the type of plane required. For the American Eagle line is a *complete* line, including all types now in demand, and varying in price from $1,895 to $18,895. There's a plane for every purse and purpose!

This is only one reason why the American Eagle franchise is considered the most valuable sales contract in the industry today. Other advantages are: *A liberal scale of discounts.* There are no higher discounts paid by any recognized builder in America. *A salable product.* Famous for its structural stability and unfailing performance, the American Eagle has rapidly become the most popular plane in its class. It is nationally advertised—known and flown everywhere. *Most important of all:* this franchise carries with it the co-operation of a well-known and soundly established concern—the first in the industry to maintain a road organization constantly at the service of its sales agencies.

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Policies have been issued over a long period of years, and among others in favor of Federal and State Governments, Boeing Air Transport, Colonial Air Transport, Colonial Western Airways, National Air Transport, Western Air Express, Northwest Airways, Walter T. Varney, Inc., Universal Aviation Corporation, Stout Air Services, Philadelphia Rapid Transit, Boston Airport Corporation, American Railway Express, Ford Motor Company, Fairchild Flying Corporation, Pitcairn Aviation, Inc., Standard Oil Companies of New York, New Jersey, Louisiana and California, Shell Petroleum Corporation, Tidewater Oil Company, United Cigar Stores, Inc., Royal Typewriter Company, Pulitzer and other race meetings, Universal Motion Picture Corporation, Fox Film Corporation, Atlantic Aircraft Corporation, Bellanca Aircraft Corporation, Chance Vought Corporation, Lockheed Aircraft Corporation, Moth Aircraft Corporation, Pratt & Whitney, Sikorsky Aviation Corporation, Stinson Aircraft Corporation, Thompson Aeronautical Corporation, Goodyear Tire & Rubber Company, International Telephone & Telegraph Company, Radiomarine Corporation of America, Westinghouse Electric & Mfg. Company, California Standard Finance Corporation, Canadian Transcontinental Airways, Ltd., Western Canada Airways, Ltd., S. C. A. D. T. A. of Colombia, S. A., Andian National Corporation of Colombia, S. A., Maddux Air Lines Transcontinental Air Transport, The Daniel Guggenheim Fund for the Promotion of Aeronautics, North American Newspaper Alliance, and many others, including Col. Charles A. Lindbergh, Sir Hubert Wilkins, Anthony Fokker, Lady Mary Heath, Miss Amelia Earhart and other leaders in aviation.

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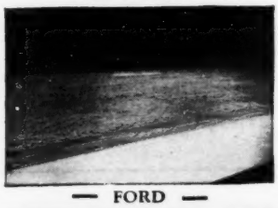

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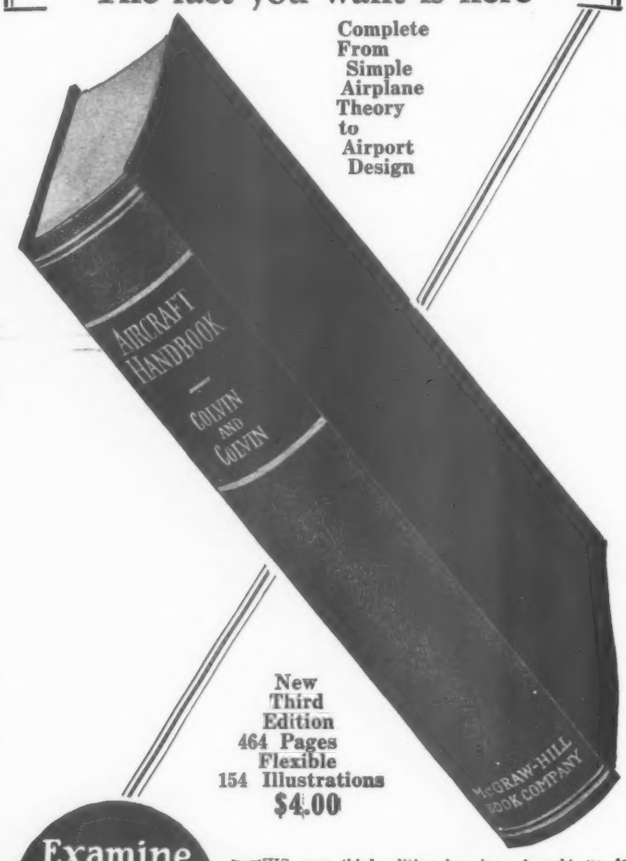

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VIII. The Curtiss D-12 Engine;
IX. Packard Aircraft Engines;
X. Pratt & Whitney Wasp Engine;
XI. The Liberty Engine;
XII. The Curtiss OX Engine;
XIII. The Wright-Hispano Engine;
XIV. Aircraft Instruments;
XV. Air Commerce Regulations;
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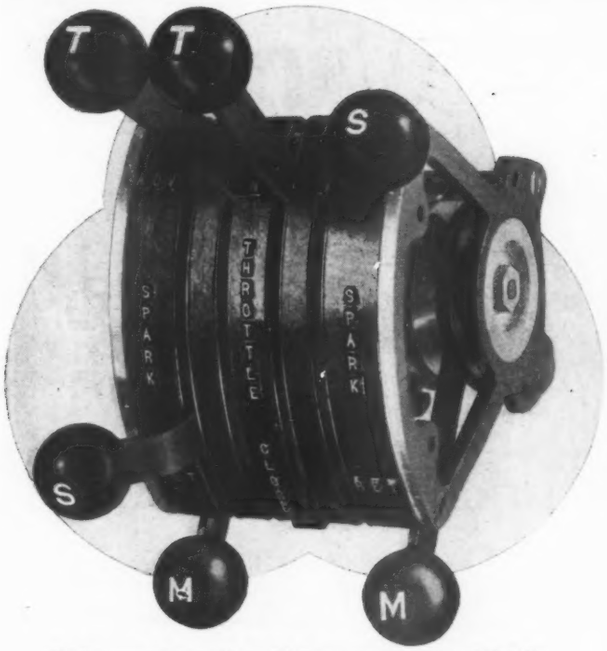

Engine control assembly—with lever control knobs of Bakelite Molded, made by Dayton Insulating Molding Co., Dayton, O.

Following Army and Navy standards aircraft manufacturers specify Bakelite Molded

COMMERCIAL aircraft frequently benefit from the standards established by the Army and Navy. After long experiment in the development of simplified engine control, Bakelite Molded lever knobs—with luminous letters—have become standard on the great majority of all aircraft.

In forming these knobs, each control lever is securely embedded in the Bakelite Molded, and unlike the wooden knobs formerly used, no rivets are required to prevent loosening. Different colors of Bakelite Molded may be used to provide easy identification for the various knobs, and this is made still more certain by deeply engraved lettering filled with a luminous material. All of these advantages are gained at a saving of 50% in production cost.

The high insulation properties of Bakelite Molded provide pilot protection against current leakage from short circuits. Through the use of red Bakelite Molded the control knobs for the "mixture" are easily and quickly identified in an emergency. Bakelite Molded is non-hygroscopic, will not deteriorate, and its lustrous finish will outlast the plane.

Manufacturers are invited to enlist the co-operation of Bakelite Engineering Service. Write for Booklet 59-M, "Bakelite Molded."

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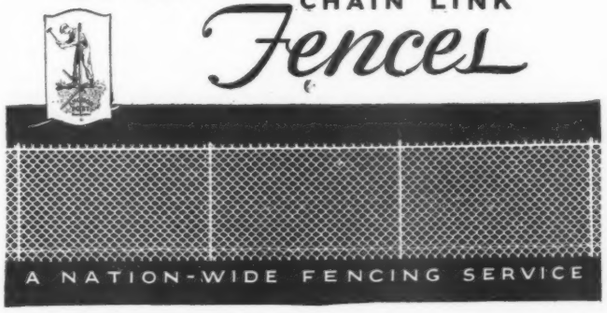

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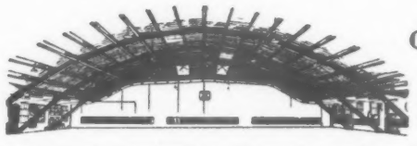

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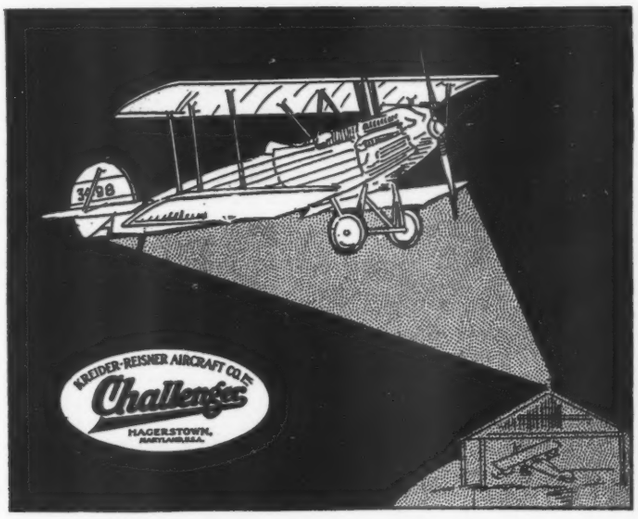

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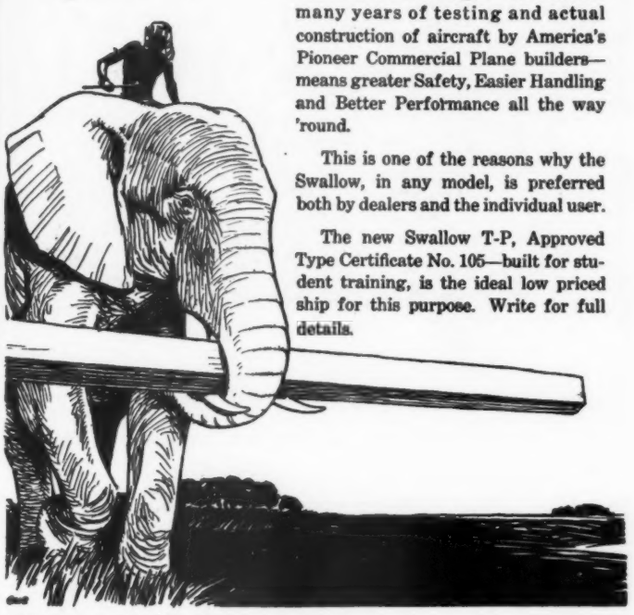

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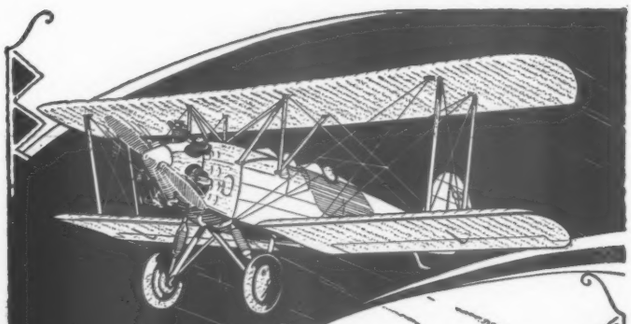

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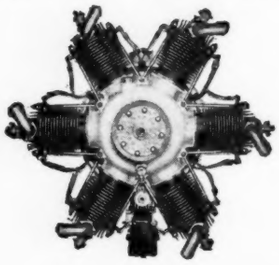

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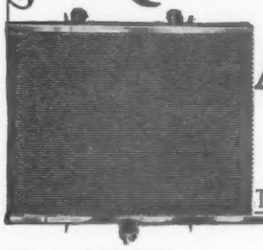

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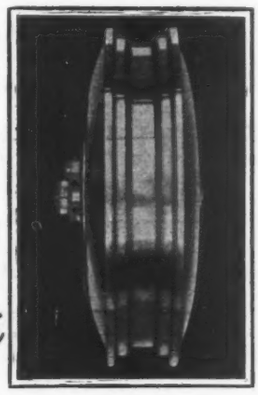

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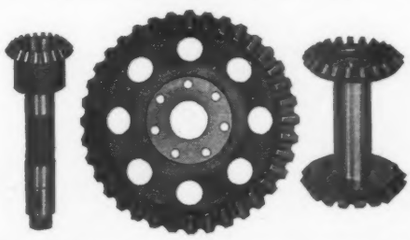

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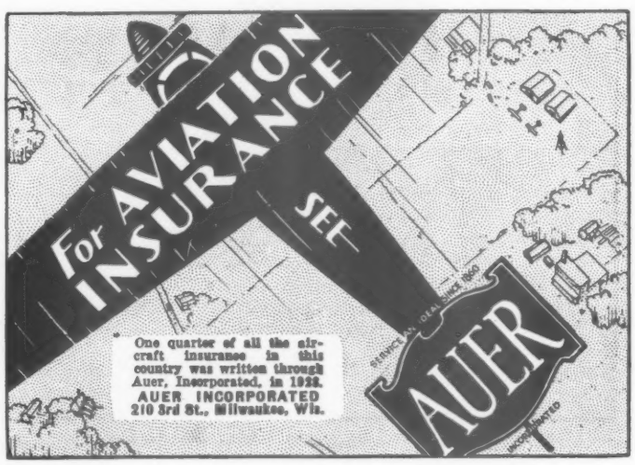
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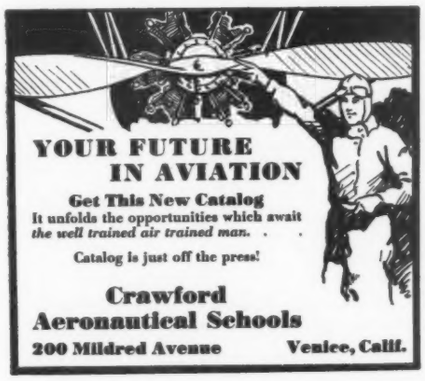
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4000 commercial airplanes were produced last year in approximately 140 airplane plants always ready to hire trained workers. This year the increase will be tremendous—and next year—and years to come. It is estimated that the value of commercial airplanes sold in the United States this year will exceed $75,000,000.00. This enormous fleet of airplanes must be built by trained men.

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A position in an airplane factory is only the start for a man of ambition. Think what the future holds in the nature of high priced executive positions in transport companies, mail lines, photographic work, mapping, prospecting, as airport managers, and in private flying. "He who hesitates is lost." "Time and tide wait for no man." This is your opportunity knocking.

DECIDE NOW

There are already eight transport companies with sixteen thousand miles routed and five thousand more miles in various stages of preparation, with at least thirty new companies under promotion, as well as the thousands of airports springing up all over the country. You are needed now. "All that you may be" depends upon your initiative—your immediate decision.

PARKS AIR COLLEGE LEADS

Parks is the largest and most completely equipped air college in the United States. When you graduate from Parks, every airline operator, airplane factory executive, and airport manager will know that you are thoroughly trained. They know the thoroughness of Parks training and have confidence in Parks graduates.

THE VERY BEST EQUIPMENT

Parks equipment includes everything in modern power plants: Whirlwind, Liberty, Caminez, Velie, Hispano-Suiza, OX5, and other famous engines are demonstrated and explained in regular class room instruction.

YOU DO ACTUAL WORK ON AIR MOTORS

You tear down the air motor and rebuild it. You test it under the eyes of experienced instructors. You learn every operation of complete shop practice, including welding, brazing, metal, working and woodworking.

YOU WILL REBUILD AN AIRPLANE

The science of Aerodynamics is demonstrated, explained and proven for you in the rebuilding of an airplane. The four months course follows a carefully standardized curriculum with no detail left undone that will produce within you the power to command *big money* in this great new industry.

WHEN YOU COME TO PARKS

You will find at Parks a camaraderie of spirit, a loyalty and pride, a courage and ethusiasm that has always marked the "man of the air." In the dormitories and recreation rooms, the thrill and adventures of the sky are re-enacted again for the buddy who cares for the plane, tunes the motor and swings the prop. His is a position of high honor and respect in the aviation fraternity—a position vibrant with life and interest—rewarded with high wages and opportunity. Now is the time. Send for our illustrated booklet. "The Man Who Tunes the Plane." It describes and pictures Parks Air College thoroughly. Fill in the coupon now.

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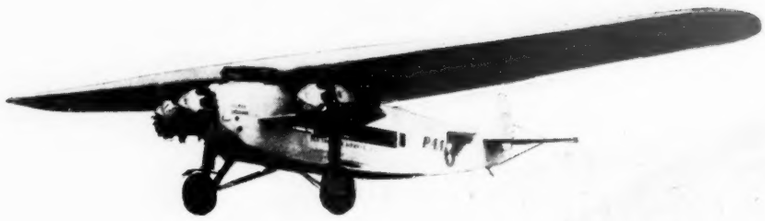

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The pioneer flight of Colonel Charles A. Lindbergh to Panama in a "Wasp" powered Sikorsky Amphibian, has opened up the wonderland of the West Indies and Central America. Travellers from the North, pleasure bent, or in the interests of commerce, now have available swift and comfortable transportation to this land rich in natural resources and historical interest.

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